

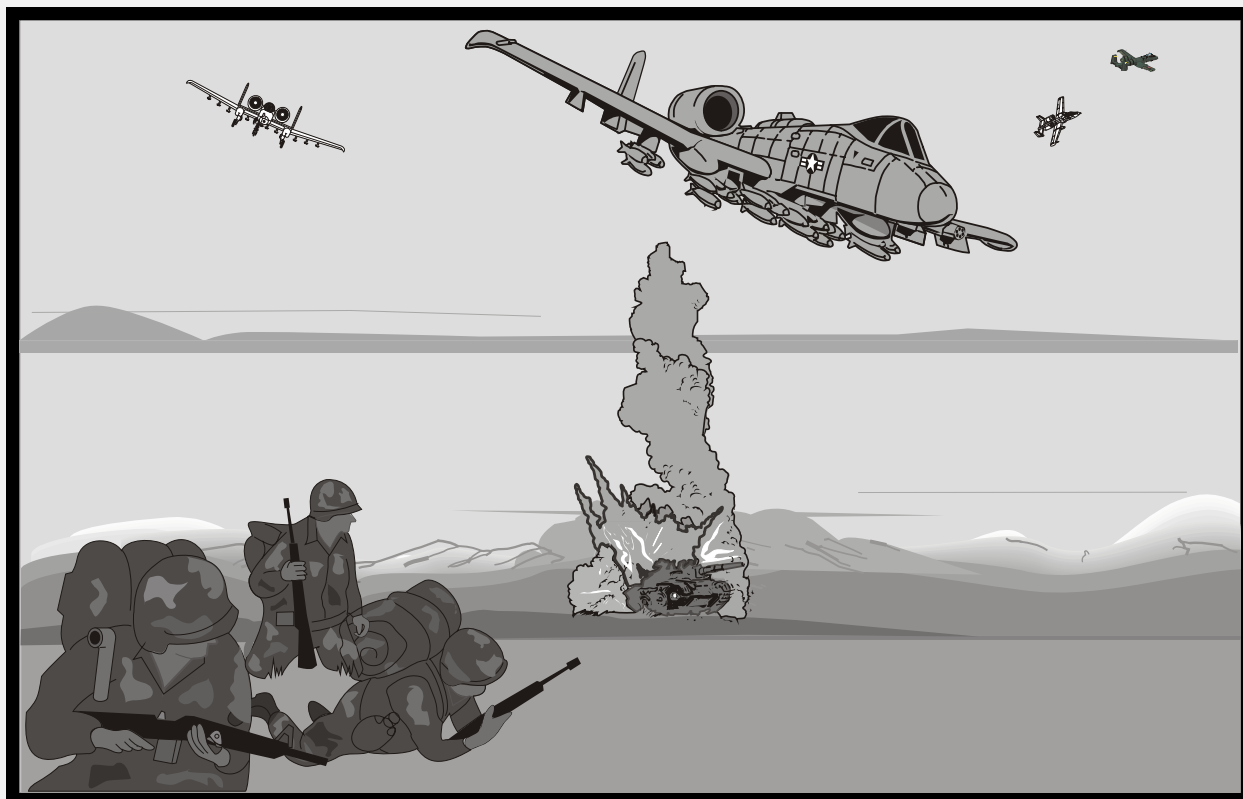


# NEWSLETTER

No. 98-13

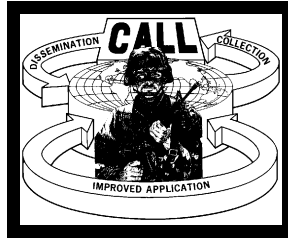
JUL 98

## CLOSE AIR SUPPORT



**Tactics, Techniques, and Procedures**

**CENTER FOR ARMY LESSONS LEARNED (CALL)  
U. S. ARMY TRAINING AND DOCTRINE COMMAND (TRADOC)  
FORT LEAVENWORTH, KS 66027-1350**



## FOREWORD

**T**he Tactics, Techniques, and Procedures described in this newsletter were developed at the National Training Center (NTC) by the Live-Fire Observer/Controllers. Every month, units conduct live-fire exercises in the Mojave Desert. These exercises provide the Dragon and Zulu live-fire trainers with the opportunity to gain experience and to see units plan, prepare, and integrate close air support, indirect artillery, and direct fires in different ways. This newsletter is part of the "training dividend" that our Army earns from the realistic training conducted through live-fire exercises at the NTC.

Combat computer simulations have evolved into sophisticated staff training tools, but provide little application for actual maneuver. The Multiple-Integrated Laser Engagement System (MILES) represents a simulation that has matured into a more capable training device for ground maneuver, but the observation of weapons effects is still absent. ***There is still no substitute for live-fire training.*** Live-fire exercises add realism to training scenarios and provide opportunities to refine the combat application of combined arms synchronization. During an NTC "live-fire" exercise, soldiers and units actually feel the ground tremble from an effective air strike, and hear the explosive ferocity of U.S. Air Force-delivered munitions. They gain an appreciation for the power of a weapon system that cannot be replicated with simulations. Staff planners gain confidence in their abilities when they see the impressive synergy that is achieved when all available weapon systems are massed on an enemy objective.

The information contained herein is provided to supplement, not supplant Army doctrine. This document is primarily designed to serve as an instructional aid to units that are training on achieving both timely and effective integration of close air support into their schemes of maneuver.



## Close Air Support



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# INTRODUCTION

**“Among military men, it is commonplace that interallied and interservice operations inescapably pose grave difficulties in execution. Differences in equipment, in doctrine, in attitude and outlook stemming from contrasting past experience all inhibit and complicate harmonious interaction. Past successes, however, have shown that these difficulties can be overcome where determination is present and effective procedures have been devised and applied by properly trained troops. Experience also shows that armed forces, not only of the United States but of other nations, have been slow to hammer out the necessary procedures. Often corrective steps have been achieved only after many failures in battle. *In no area of interservice operations has this phenomenon been more pronounced than in the matter of close air support.*” (emphasis added)**

**Excerpt from “Case Studies in the Development of Close Air Support,” I.B. Holley, Benjamin F. Cooling, Editor, Office of Air Force History 1990.**

The National Training Center (NTC), Fort Irwin, CA, conducts the largest force-on-force and live-fire training exercises in the world. The continuous presence of ground forces at the NTC provides excellent opportunities for integration training exercises. To maximize these opportunities, the U.S. Army and the U.S. Air Force have, since the very first NTC rotation, put tremendous resources into a comprehensive Close Air Support (CAS) training program. This newsletter discusses some trends and lessons that have surfaced, and offers some techniques that have developed over the years as a result of NTC’s CAS training efforts.

Chapter 1 discusses Close Air Support trends at the NTC. As maneuver, fires, and combat service support performance trends have been documented throughout the years, so too have CAS operations performance trends. Recently, the NTC upgraded their Leader Training Program (LTP) to emphasize trends and the recommended tactics, techniques and procedures (TTP) to correct them. Chapter 1 highlights the current “top three” negative trends dealing with CAS planning and integration.

Chapter 2 presents a definition of the Army-Air Force 3-D battlefield. This chapter highlights many of the concerns related to integrating CAS at brigade and below. It is not intended to be a reference for joint operations or airspace command and control; rather, it is a point of departure for brigade and battalion battle staffs to get their hands around the third dimension in their sector or zone. A parallel effort to the NTC’s “Trends Reversal Program” was a rewrite of the CAS Rules of Engagement (CASROE). This rewrite was, in part, a response to the frequently repeated question, “Why can’t we do altitude separation?” and the frequent complaint, “We can’t mass CAS with other fires because we must always shut off direct/indirect fires during the air strike.” The rewrite was the right thing to do for the Army and Air Force. So now the CASROE allows for overflight of direct or indirect fires by CAS, with the altitude separation technique in place.

Chapter 3 is a detailed discussion on how to deconflict CAS, maneuver, and indirect fires. The old days of “check fire for CAS” as an airspace control authority (ACA) method (never doctrinal) are gone. When considering the capability to mass simultaneous fires, it becomes blatantly obvious that there are doctrinal and TTP gaps that exist between the Army and Air Force on how to deconflict fires within the brigade zone.

A major feature of this chapter is how to do altitude separation, according to the most recent CASROE, during live fire. Conducting altitude separation in live fire is a dramatic step forward for the Army and Air Force. The altitudes, ranges, ricochet hazards, etc., presented here are based on CASROE -- established values as of the time of this writing. New safety data may come to light which could modify these values in the future, so read the CASROE carefully before you go into the “box.” Units which train altitude separation TTP and ROE to standard will have the opportunity to mass artillery, CAS, and direct fires on the same or nearby targets simultaneously in live-fire battles. But it takes some study, battle drill standardization, SOP modifications, and most importantly -- *practice*.

Chapter 4 is a step-by-step planning technique for CAS employment, developed at the NTC. It is a modified version of an article written by (then CPT) MAJ Samuel R. White, Jr., “**Technique for the Employment of Close Air Support (CAS)**,” originally printed in **CALL Newsletter No. 95-10**, Jul 95, *Fighting with Fires II*.

Appendix A contains two short practical exercises on deconflicting CAS with maneuver and fires. Solutions

to the exercises are included.

Appendix B is a reference copy of the National Training Center's Close Air Support Rules of Engagement, 26 October 1996.

\*\*\*\*\*

This newsletter is the product of numerous Army and Air Force officers and NCOs who work hard to enhance unit training opportunities during an NTC rotation. The author would especially like to acknowledge the Marine Corps Air-Ground Combat Center Commander and Staff for their time and expertise, and the Air Force Air Warrior personnel for their ROE and TTPs for altitude separation and CAS integration.✪

## ***Close Air Support!***





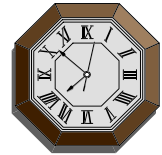
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## CHAPTER 1

### CLOSE AIR SUPPORT TRENDS AT THE NTC

**T**he trends reversal program underway at the National Training Center (NTC) is designed to highlight and fix force-wide warfighting problems that units often experience here. Part 1 of this chapter highlights three trends which continue to plague brigade combat teams, thus frustrating Close Air Support (CAS) integration and execution, and contributing to force-on-force fratricides. Part 2 discusses the critical staff actions that must be accomplished to break these trends. Part 3 provides additional references and notes.

#### PART 1. THE THREE COMMON ISSUES.



##### **ISSUE 1: LACK OF TIMELY TARGETING.**

**OBSERVATION:** Battle staff target identification and commander approval processes are taking too long, to the point that numerous sorties run out of gas before getting target grids and permission to attack.

##### **DISCUSSION:**

1. There is a problem with commander and staff indecision during execution. Several issues contribute to this indecision, and it begins with planning.
  - a. Commanders too often do not share a "vision" in their guidance of how CAS will integrate with maneuver. They are not looking to use CAS to effect an enemy formation or its function (high payoff target (HPT)) to allow maneuver success.
  - b. Staffs do not continuously track, refine and update CAS HPTs when they are identified. They do not ask for enough detail or focus pilots (FAC-As in particular) with intelligence to help find/confirm critical target information.
  - c. Staffs do not look at a methodology during planning/wargaming to employ (insert) Enlisted Terminal Attack Controllers (ETACs) to control sorties once a CAS targeted area of interest (TAI) has been identified.
2. Command posts lack staff organization.
  - a. Staffs have inefficient targeting cell meetings.
  - b. Air Liaison Officers (ALOs) and Fire Support Officers (FSOs) do not work side by side.
  - c. Staffs do not proactively execute CAS, particularly immediate CAS, so that the coordination is done prior to the fighters' arrival on station.
  - d. Commanders are often changing CAS targets right up to execution.

##### **RESULTS:**

1. Targets passed during execution often stray from the HPT list.
2. Focus is lost, and CAS is wasted on insignificant targets, or no targets at all.

##### **RECOMMENDATIONS:**

1. Hold collective planning, rehearsals, and targeting cell meetings (huddles) during execution. Conduct these staff huddles every 30 minutes. These continuous huddles provide valuable coordination between members of the staff. Participants should include: XO, S3 Air, S2, FSO, ALO, ADO. These participants should anticipate the



arrival of CAS sorties, and ALOs can provide a valuable "heads up" to the staff on fighter estimated times of arrival (ETAs).

2. Continually develop targets for CAS and SEAD throughout the battle and be prepared for short notice of fighter arrival. The BOS chiefs must set the conditions early to minimize fighter time on station.

3. It is very common that most CAS will come in the form of *immediate or push CAS* for brigades and task forces. Treat immediate CAS as an opportunity to exploit additional combat power. *Establish a staff battle drill* which features rapid target identification and prompt input of execution instructions from all participants. Major features of this battle drill are a staff which continuously tracks HPTs, provides the commander with only clear, succinct target options that meet his intent, and coordinates the airstrike prior to aircraft on station.

4. Be realistic about how much time it takes to set up and employ CAS missions. The average time (at the NTC) for a well-drilled brigade fire support element (FSE) to establish the conditions and employ an air strike is 15 to 20 minutes. (A relevant discussion of fire support time planning factors can be found in the table, "Basic Guidelines for Placement of DPs", page 6, Annex A, **FM 6-20-10, The Targeting Process**).

## **ISSUE 2: FAILURE TO PUSH CAS TO TASK FORCES AND POOR UNDERSTANDING OF "CLOSE CAS" PROCEDURES.**

**OBSERVATION:** The brigades (or regiments) tend to retain all target and execution options and rarely allocate CAS to the task forces (or squadrons). With brigades attempting to control CAS in the close fight, no assets are pushed forward to Air Liaison Officers (ALOs) or Enlisted Terminal Attack Controllers (ETACs) for direct control. Task force staffs do not plan for CAS employment because they are not given the mission and have no allocation of sorties.



### **DISCUSSION:**

1. Because of faulty wargaming, the brigades are often too absorbed with the deep battle, at the expense of the close fight. Brigade staffs neither identify the desired combat ratios necessary for the close fights, nor push CAS forward to help set those ratios.

- a. Critical formations and functions for CAS to engage are not identified.
- b. The contributions CAS must make to the close fight are not specified.
- c. Inherent risks associated with "Indirect Control" in the close-in fight are not recognized.

2. At the task force level, commanders and staffs sometimes forget to provide adequate logistical or force protection resources for Tactical Air Control Parties (TACPs) to properly position for direct control of CAS in the close fight.

### **RESULTS:**

1. Brigade-level TACPs attempting to control CAS from remote locations have contributed to fratricides and near fratricides.

2. Battalion-level TACPs are not tasked to provide direct control for air strikes close to friendly units within their zones or sectors.

### **RECOMMENDATIONS:**

1. Brigade staffs should target enemy forces by formation and function, recognizing that the desired enemy force will not always be found in the deep battle.



2. Resource the task forces, and have them *plan* to utilize CAS in the close fight to obtain favorable combat ratios. Task forces should train to employ immediate and push CAS as the norm, with a staff battle drill that rapidly develops and executes CAS missions.

3. In the close fight, Direct Control procedures are paramount to mission survivability, fratricide prevention, and ultimate success.

a. Task force maneuver units must have a battle drill (plan) to rapidly and clearly mark their FLOT, day or night.

b. The fire support system must be prepared to rapidly mark targets.

c. ETACs must be planned and rehearsed to be in position to exercise Direct Control.

d. Task forces must integrate maneuver, fire support, and A<sup>2</sup>C<sup>2</sup> graphics, coupled with a repetitive position reporting cycle to decrease the probability of fratricide (conversely increasing the probability of success).

4. The brigade and its task forces should have a checklist to speed coordination of mission handoff, with particular emphasis on deconflicting all other aircraft and fires (i.e., direct, indirect, helicopter and other CAS fires). Rapid transmission of up-to-the-minute friendly positions, particularly individual positions, such as COLTs, OPs etc., is critical to reducing risk.

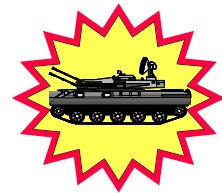
5. References:

a. **Joint PUB 3-09.3, JTTP for the Employment of CAS**, for definitions of "direct control" and "indirect control."

b. Chapter 2 of this newsletter, "Defining the Army-Air Force 3-D Battlefield."

### **ISSUE 3: POOR SUPPRESSION OF ENEMY AIR DEFENSE (SEAD).**

**OBSERVATION:** Units have difficulty executing SEAD Call for Fires (CFFs) quickly and efficiently. SEAD is usually reactive and not pre-planned or programmed using adequate risk analysis techniques.



**DISCUSSION:** Units that do not consider all the factors associated with planning and coordinating for SEAD are usually unsuccessful in execution. Some of the common problems observed:

1. Units seldom identify or treat enemy Air Defense systems as a priority information requirement (PIR) and, when they do, the staff only searches for these systems when CAS is on station.

2. ADA systems are usually identified as an HPT, but the execution is not adequately prioritized by the staff or resourced by the fire support system.

3. SEAD, as an Essential Fire Support Task (EFST), is often not identified, planned or rehearsed in the scheme of fires.

4. When carried out, units sometimes execute SEAD fires technically incorrect, (i.e., wrong timing, insufficient volume, etc).

### **RESULTS:**

1. Lack of prior planning and coordination causes delays, because units try to overlay SEAD missions when FA fires are already heavily engaged.

2. SEAD CFFs are not tagged or prioritized and, thus, get lost in the system or execution cue.

3. SEAD fires tend to delay air strikes and are often ineffective.

### **RECOMMENDATIONS:**

1. The requirement for SEAD should be an *ALO* call, as a tactic for successful employment. It is determined by the factors of METT-T, addressed by all of the BOS chiefs *and the pilots*. *If there is a*





recommendation **not** to provide SEAD, then the commander must be informed. When there is no SEAD by FA systems, aircraft can compensate by doing "Self-SEAD," changing attack routes, terrain masking, altitude changes and/or a new target, but these compensatory efforts can degrade the effectiveness of the sorties.

2. The best conditions for a CAS attack are obviously when there are no ADA systems or when there is an effective suppression of ADA systems. Therefore, ***make a commitment to kill identified ADA systems as they are located.*** The cumulative effect of ADA system destruction can produce favorable conditions for future CAS attacks.

3. Make sure the target report meets the Target Selection Standards (TSSs), i.e., the target location meets accuracy requirements and timeliness with respect to the report. If you do not have an ADA system report which meets TSSs, consider executing SEAD in conjunction with the air strike to suppress ADA systems within the target array, such as SA-14, ZSUs, etc.

4. For simultaneous target engagement, use altitude deconfliction or time separation informal ACA methods. There can be tremendous benefits for continuously suppressing the CAS target to facilitate fighter ingress and prevent aircrew disruption due to counter-fires from the target itself.



## **PART 2. CRITICAL STAFF ACTIONS.**

The following is a discussion of some of the most critical actions members of the command and staff must accomplish to break these negative trends.

**1. COMMANDER:** Provide clear guidance regarding what enemy formation or function to attack and why. Mass your CAS sorties on your critical targets. Once in battle, authorize your staff to execute targets with little guidance and let your HPTs and priority of fires drive the employment. Realize that CAS is force-oriented; keep in mind your primary target will move (enemy in the offense) or may be in secondary/alternate locations (enemy in the defense). You must give your staff (and CAS) depth and time to contribute to the success of your critical tasks. Discuss CAS in terms of time and space or phase of the operation to help the integration effort.

**2. XO:** To get the commander's approval rapidly, you must understand his intent and pro-actively develop and recommend CAS targets to him (seek pre-approval if possible). You accomplish this through well-timed staff huddles which produce several viable targets just prior to CAS arrival. Pre-planned sorties are a luxury; train your staff to execute Immediate or push CAS with little warning as to the actual arrival time of fighters. The BOS chiefs must remain constantly aware of the situation, pertaining not only to their BOS responsibilities but to each others as well. Make CAS a high priority while fighters are on station.

**3. S2:** Timeliness begins with the S2 being able to continuously identify and track CAS HPTs. Be prepared to utilize the FAC-A (through the ALO) to confirm or deny target information. Contact higher regularly to update ADA targets, particularly 30 minutes prior to an air strike. Do not forget non-lethal SEAD measures you may have at your disposal. Train the ALO/ETACs on how to derive intelligence from their pilots. Integrate pilot reports into your human intelligence process to develop the situation.

**4. S3/S3 AIR:** Submit CAS requests per doctrine and unit SOPs. Be sure you understand the brigade/division target cycle so you can make timely requests and update/refine those requests as necessary. The S3 must be involved in final approval of FSCMs, ACAs, Air BPs, Air Corridors, Artillery/Mortar position areas as they



relate to maneuver. Be the devil's advocate; watch for situations which would cause fires to be interrupted (or worse, fratricide risks) during planning and rehearsals. Prioritize the execution of close-in CAS. To do this, ensure Terminal Controllers (TCs) are near the FLOT or target areas and watch maneuver elements to keep them clear of target areas.

**5. FSO:** Prioritize and rapidly execute lethal SEAD which meets target selection standards at every opportunity. ***Always plan and rehearse SEAD on CAS target areas and marking rounds.*** Marking rounds should not be an option for close CAS missions. Constantly coordinate and re-coordinate informal ACA methods, throughout planning and execution, to ensure simultaneous or near simultaneous fires can be achieved. Include CAS attacks within the scheme of fires and have the ALO rehearse with the rest of the fire support system at the appropriate times. Know the status and location of all firing units DS, R, Mortars and D/A, at all times. You will not have time to confirm this information once CAS is on station. This information is *vital* for establishing IP, ACAs and TOT decisions which will cause little to no interference between fire support systems.

**6. ALO:** You must fully understand the commander's HPTs, not just what enemy to attack, but why...what must my sorties accomplish against a particular formation. Get ahead on execution by pre-coordinating nine-line messages for all EAs or objectives with the FSO. Coordinate the positioning of ground FACs and work with the S2 to get his input on where to utilize a FAC-A for the intelligence effort. Be sure you coordinate your triggers with the S2, S3 and FSO to make sure they are viable, don't forget to reconfirm them during execution. Learn how to collect pilot intelligence which has specifics which are directly related to what the staff needs to make decisions. Be prepared to train the S3 Air and FSO on how to work 1972s and use your Air Force C<sup>2</sup> to assist the pre-planned CAS request process. Focus your 1972 requests on desired ordnance, type of aircraft and expected time window. Train the staff to execute Immediate or push CAS as the norm. Finally, command and direct FAC-A, GFAC, and fighters to achieve the commanders guidance. When current, known targets do not fit the commander's intent well, then recommend the next best use of CAS for now, while continuing to look for the commander's target.

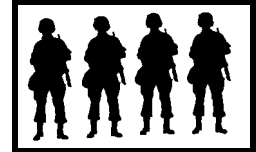
**7. ADO:** Maintain a constant plot of friendly ADA systems and keep the ALO situationally aware of these locations and the SHORAD status. Immediately alert SHORAD of the arrival of friendly air assets and provide updates when expected CAS target locations move. Acknowledge all aircraft traffic reports. Rapidly modify the units' Air Defense Warning/Weapons Control Status and notify the staff when all subordinate units acknowledge the status change.

**8. UNIT:** *Task forces and above should always plan to use CAS, even if none is currently allocated.* Task forces can and should always request Immediate CAS to attack targets of opportunity which meet the commander's intent. Build your CAS execution plan from the close fight...out, by phase if possible. Position your ALO/ETAC observers where they can control a wide variety of attack options, *using Direct Control Procedures.* Provide adequate TACP logistical/force protection support based on METT-T. Develop an SOP with brigade which standardizes methods to rapidly mark your FLOT, day or night.



### **PART 3. THE IMPORTANCE OF HOME-STATION TRAINING.**

It has become a disturbing fact that over the past year brigades have had little or no CAS participation in their trainups. Real-world mission demands, scheduling conflicts, and missed opportunities have taken a toll on the mechanized forces' ability to train. These situations require an imaginative FSO/ALO team to keep CAS planning "in the loop."

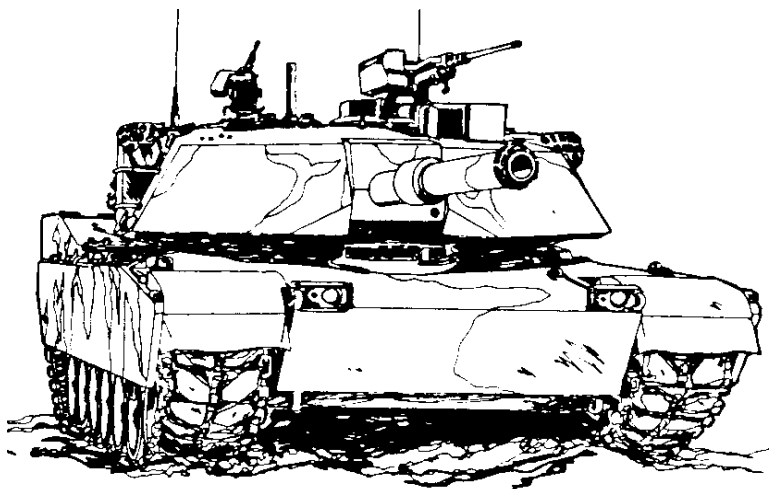


The lack of training maintenance has severely impacted the integration of tactical air control parties (TACPs) into the plan; bad habits are becoming the norm:

- ALOs are not being trained and integrated into the planning processes.
- Army staffs do not know what to expect from an ALO, during planning and rehearsals.

A good start to overcoming this negative trend is to always "play" CAS, even if it is notional.

- Put CAS in the fire support plan.
- Allocate sorties to subordinate units.
- Request other Air Force personnel "role play" fighters and FAC-As in support of field exercises.
- Exercise the fire support system to handle immediate, short-notice CAS.
- Have the TACP conduct OPDs which show the capabilities of air-delivered ordnance, employment techniques, and how fighters execute air strikes.
- Take the TACP personnel to a battalion and battery FDC during live fires so they will gain an appreciation of what happens in these critical control centers.☺





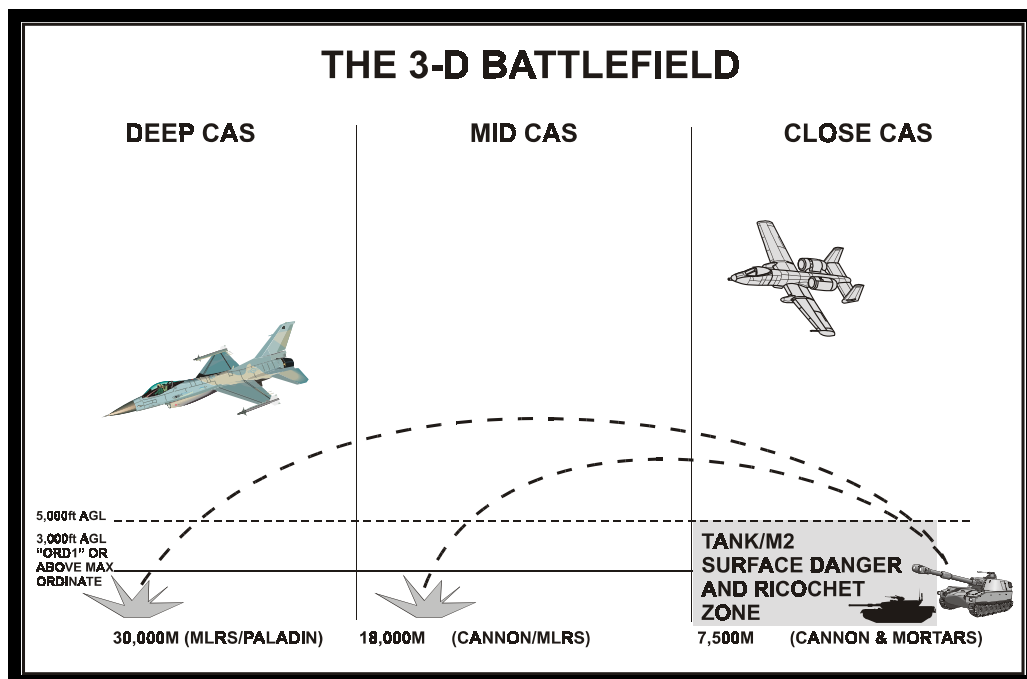
## CHAPTER 2

### DEFINING THE ARMY-AIRFORCE 3-D BATTLEFIELD

This chapter provides an overview of the complexities associated with airspace coordination over and in front of a ground maneuver element, brigade-sized and below. The "3-D" Army - Air Force battlefield is a crowded piece of airspace with attack and lift aviation assets, unmanned aerial vehicles (UAVs), indirect fires, surface fires and fixed-wing assets from every service. Since the demise of battlefield aerial interdiction (BAI) from doctrine, the term CAS has taken on the battlespace short of the Fire Support Coordination Line (FSCL).

The question always asked by brigade commanders is, Where do I employ CAS? A good article to begin with is one written by Colonel Gary Buis, USAF, published in the *Air Land Sea Bulletin (ALSA)*, December 1996, titled "*Air Warrior/National Training Center, Now Verses Yesterday.*" In his article, Colonel Buis offers a method of sectoring the brigade airspace into three "CAS Zones," namely, **Close, Medium, and Deep.**

This chapter expounds on the Army's responsibilities within those three zones, with a focus on deconflicting aviation and ground assets/fires in the **Close** CAS Zone. We will start our discussion with the Close CAS Zone and work forward from the forward line of own troops (FLOT). (**Note:** Many of the ranges depicted on the following charts relate to weapons and training ammunition used at the NTC. They conform to various safety references and rules of engagement (ROE).)





## What is the Close CAS Zone (CCZ)?

The Close CAS Zone presents the highest planning and execution challenges you will face while employing CAS. The CCZ is a *non-doctrinal reference* to the close-in fight, defined by the maximum direct fire weapon ranges of the ground maneuver element.

Of course, the range of this zone can vary greatly between a light infantry battalion and an armor battalion. At the NTC, we use the area defined by a M1A1 Tank 120-mm gun training round's *Ricochet Danger Zone (RDZ)* since this round produces the "worst case" ricochet hazards. The 120-mm RDZ is an area defined as 7.5 kilometers long and 5,000 feet high.

Areas outside these dimensions provide *absolute protection* from direct fire ricochets for fighters operating over a direct fire fight. To execute a CAS strike without shutting down maneuver element fires, it is imperative to define this protected air-battle space. Using the above RDZ logic, the NTC Close CAS Zone (CCZ) is the area in front of the FLOT out to 7.5 kilometers and above 5,000 feet. A fighter must stay outside and above this zone to avoid the effects of direct fires.

*Execution* of CAS within the CCZ is *almost always a task force responsibility*. Once the brigade decides where it will employ CAS (understanding that CAS planning by Air Force doctrine is centralized), the brigade TACP must task the task force air liaison officers (ALOs) and staffs to plan the CAS employment that will occur within their zones/sectors. Brigade TACPs usually are not in position to execute *Direct Control* missions. While the enemy target and CAS allocated to strike it may have been directed by the brigade commander, the task force TACP/FSE needs to clear it and control it in their sector. The contributing factor to numerous reported force-on-force CAS fratricides is that the brigade was controlling air strikes close to a task force/company team without direct control.

### Historical Example of CAS Fratricide: The Korean War's Worst Incident.

"On September 22, a flight of Mustangs bombed and strafed the 1st Battalion, Argyll and Sutherland Highlanders, British 27th Brigade. Attacking during the Mustangs' errant strike, the North Koreans drove the Highlanders from their hill; enemy action and the accidental airstrikes killed and wounded seventy six Scouts. Although the [Mustangs] had obtained directions from both a FAC and a Mosquito [callsign for an airborne TAC], they had struck the wrong position. Fortunately, British high commanders in the Far East then regarded the mistake as merely regrettable. [Lt. Gen] Stratmeyer and [Maj. Gen.] Partridge appreciated the interallied understanding, doubting the American press would have been so kind had it known that *the ground FAC had directed a strike seven miles from his position* (emphasis added)."

## What is Required to Execute Air Strikes within the Close CAS Zone?

*First*, establish qualified Air Force ground terminal controllers in positions where they can execute missions using *direct control procedures* when releasing weapons, i.e., giving clearance to drop/fire. According to the **Joint Publication 3-09.3, "Joint Tactics, Techniques, and Procedures for Close Air Support,"** positive control means the TACP is able to observe and control the attack. To the NTC, this means the TACP knows his ground forces' locations (usually he's collocated), sees the target area, and can observe the attacking aircraft with enough clarity to verify it is oriented on the target area. Forward Air Controllers-Air (FAC-As) can accomplish these requirements when aircraft are operating at medium and high altitudes. Experience has shown that if an aircraft visually augments his flight path, such as shooting off periodic flares, a ground TACP can distinguish

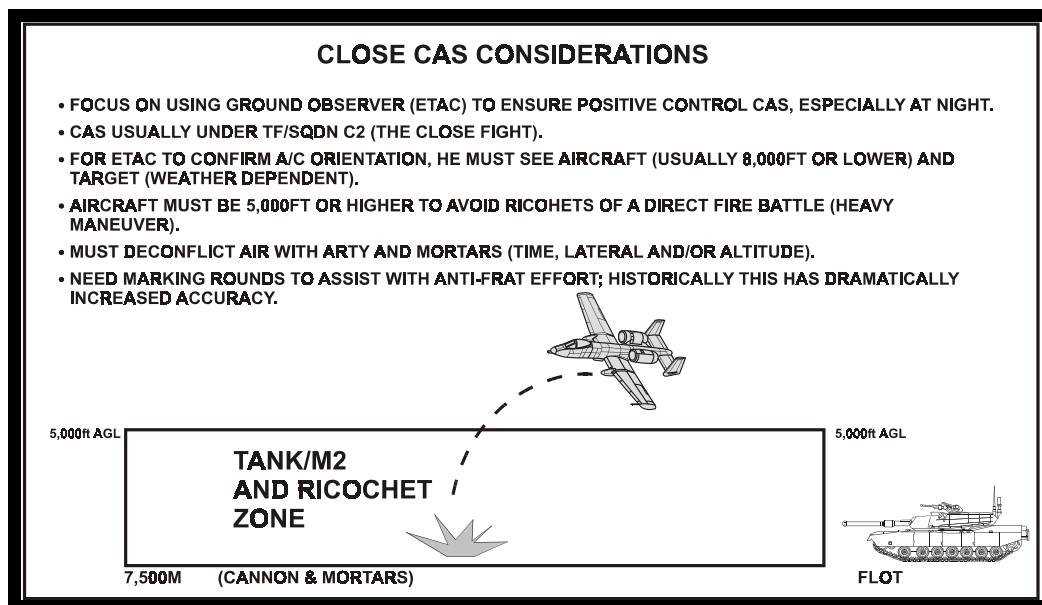


fighter orientation between 6,000 and 8,000 feet above ground level (AGL). Above that altitude, it is almost impossible for ground FACs to verify fighter orientation. The FAC-A can accomplish these higher altitude attacks as long as he gets a target mark, can see the fighters, and can determine friendly force locations. Meeting these direct control conditions is harder than it seems; numerous attacks rapidly deteriorate to "indirect" control procedures and sometimes degenerate to "reasonable assurance" in numerous force on force battles, which is a leading cause of fratricides. (See notes for an explanation of indirect control and reasonable assurance (RA).)

**Second, positively mark/identify friendly force locations.** Currently there is not a single visual marking aid which works in a wide variety of METT-T situations. The "day-glo" orange panels, fire-fly lights, glint tapes and infrared pointers have a value in specific situations, but with aircraft making multiple passes or orbits over a target area to confirm friendly/enemy locations, it is obvious our maneuver forces still lack adequate marking aids. The need and ability to mark our locations quickly and effectively is not well addressed in doctrine, TTPs, and unit SOPs. In live-fire operations, units must often improvise marking aids when they get to the NTC to satisfy this basic fratricide prevention requirement. Night CAS amplifies this friendly marking problem even more. The proliferation of laser pointers, night-vision devices, and the washout caused by an intense fire fight/burning vehicles can compound the identification problem to the point that it becomes almost impossible to accomplish certain attacks.

**Third, mark the target.** History has shown that marking targets has dramatically increased the probably of first bombs on target and lessened the probability of fratricide. Target marks in the Close CAS Zone must be visual to the naked eye, can be delivered by numerous indirect fire systems or FAC-A rockets, and may be smoke, illumination, or clearly distinguishable high explosive munitions. Target marks provide the ground force observers the opportunity to confirm correct target location and orientation of fighters prior to weapons release.

The following illustration graphically depicts the Close CAS Zone with other considerations for planning and execution.





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## **Where is the Medium CAS Zone (MCZ), and What Do I Have to Accomplish There?**

The Medium CAS Zone begins at the end of the tank surface danger zones (7,500 meters (7.5 kilometers) from the maneuver FLOT), and extends out to about 18,000 meters (18 kilometers). The far end of the zone is actually determined by the types of Direct Support and Reinforcing battalions (DS/R) that are supporting the brigade.

The range of DS/R artillery beyond the FLOT determines a unit's ability to support CAS assets with SEAD or mutually attack targets. The 18-kilometer rule generally applies to all 155-mm, self-propelled artillery ranges and excludes special range augmentation munitions such as Rocket-Assisted Projectiles (RAPs), etc. Depending on the distance of the DS/R units behind the FLOT, RAP may be required to range 18,000 meters across the entire brigade sector/zone. For discussion clarity in this newsletter, 7.5 to 18 kilometers is used.

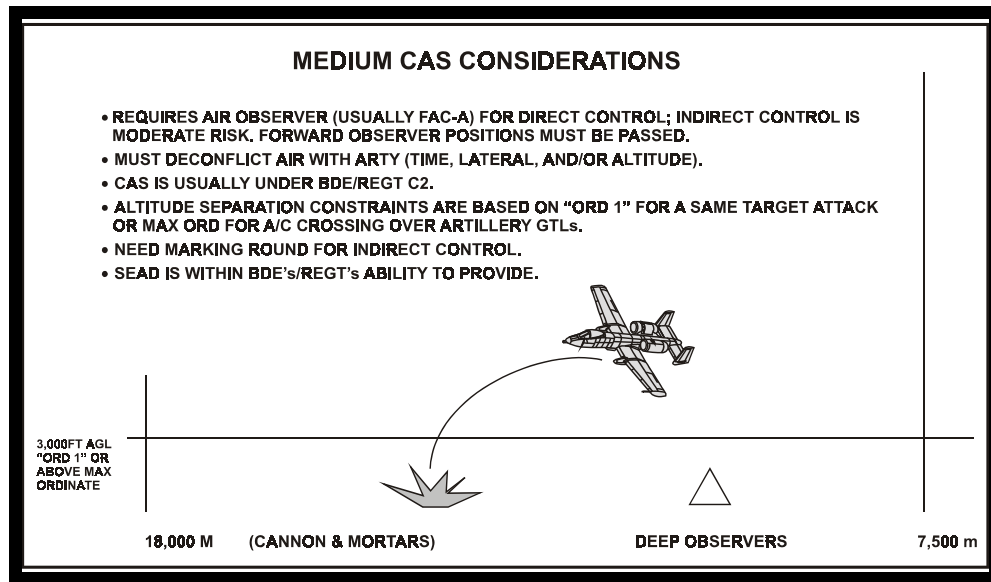
***The MCZ is an ideal killing ground for fire support assets***, providing good standoff ranges to execute triggers, opportunity to mass munitions over time, and plenty of airspace for fighters to maneuver through. The MCZ allows for massing of indirect and air support fires early on enemy forces to cause attrition, disruption, and delays in his battle scheme. This zone provides an opportunity for the brigade to mass on subsequent enemy echelons during the defense or offense to set favorable combat ratios for the task force close fights.

***Terminal Control will almost always be Indirect*** (unless there is a FAC-A on station or a TACP integrated with reconnaissance or "deep eyes" missions). Once the FAC-A has identified friendly forces (i.e., scouts, COLTs, etc.) forward of the FLOT, he can then work Direct Control Procedures. The brigade will seldom have the opportunity to insert ground TACPs deep enough to meet these requirements without accepting tremendous survivability risks. Army doctrine tries to compensate for this by advocating that field artillery observers (COLTs) could provide indirect control assistance. In practice though, neither the Air Force nor the Army have a training program to train the necessary procedures to standard for artillery observers.

***Marking friendly forces*** usually means using an appropriate day or night-time device to visually augment the forward observers, passing the NFAs to the fighters/FAC-A and associating observers with identifiable terrain. During night-time NTC live fires, the FAC-A or fighters will make a visual confirmation of all deep assets prior to being allowed to release ordnance.

***Marking the target*** is no less important in these attacks. Remember--the benefit of marking a target is positive target identification; get the fighters to *kill the right enemy*. Do not simply call grids to the fighters and expect them to identify the correct enemy; the view from the air can be radically different from the ground. A FAC-A may see multiple enemy formations that are not visible from the ground so a mark could ensure he focuses on the correct enemy.

The following illustration graphically highlights some other planning and execution considerations for the staff to work through.



## The Deep CAS Zone (DCZ) and its Purpose.

As mentioned in Colonel Buis's article published in the *Air Land Sea Bulletin (ALSA)*, December 1996, titled "*Air Warrior/National Training Center, Now Verses Yesterday*," the term "Battlefield Aerial Interdiction (BAI)" is no longer in use. The Air Force uses only "Aerial Interdiction (AI)" and "CAS" in its doctrinal discussions of where to employ air power. CAS, as the primary air resource for the brigade, has a very large area with which to contend.

The Deep CAS Zone could be the area from 18km to 30km or the forward boundary of the FSCL. A good planning figure for range of the Multiple Launch Rocket System (MLRS) and the M109A6 Paladin with extended range munitions is 30,000 meters.

Missions flown in this zone could be "*interdiction*" for a brigade. In this zone, the enemy can be influenced several hours prior to direct fire contact. The command and control of these strikes is more challenging than it may first appear. The quality of the intelligence coming from higher/outside sources added to the limited ability of brigade assets to see that deep, generate some targeting confidence issues. The FAC-A must be well briefed to assist the brigade intelligence/targeting effort and find the right enemy formations. A thorough intelligence brief is paramount to achieving the desired payoff of using fighters in this zone.

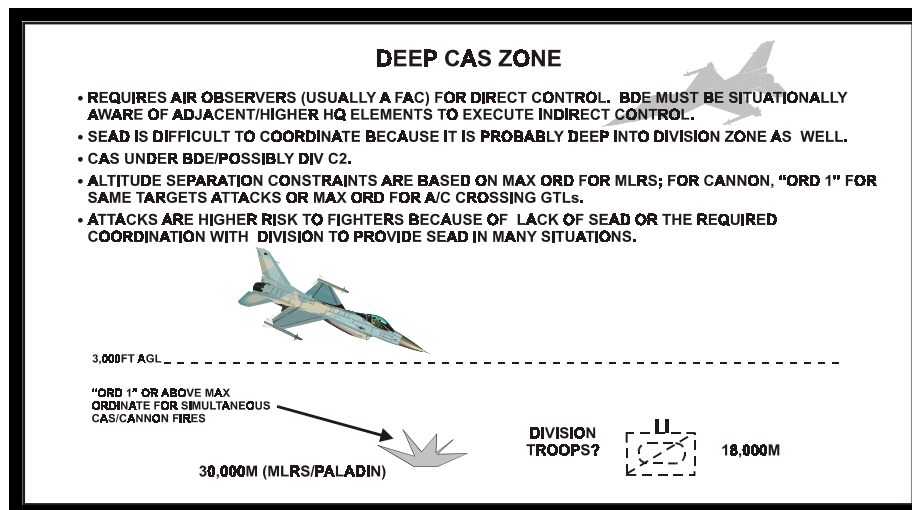
Direct Control will almost certainly only come in the form of a FAC-A. If you must fly these missions under Indirect Control, you must double your efforts to verify the locations of adjacent and higher unit elements which are operating deep. Remember--these missions will plot close to the far end of the brigade zone or sector, probably beyond your CFL. In the course of pursuing a moving enemy, the attack may actually occur in the division zone where deep reconnaissance and cavalry squadrons may be operating.





**Target marking** will come in form of high explosive indirect fires or FAC-A smoke rockets. Army attack aviation working deep could provide valuable target intelligence, marking, artillery adjustments, and mutually supporting SEAD for the air strikes. Artillery coordination may take longer because of the distinct possibility of having to use division artillery assets to support the missions, rather than your own brigade assets. As with the Medium CAS Zone, *this zone will also contain the enemy's artillery assets* which are the prime targets of friendly counterfire operations. This creates a high demand for coordination between CAS and artillery due to the counterfire fire battle demands.

The following illustration of the Deep CAS Zone shows some additional issues for planning and execution.



## CONCLUSION AND NOTES.

In the discussion of the Close, Medium, and Deep CAS Zones, we have highlighted the critical risk factors associated with training ammunition used at the NTC. During peacetime we develop standoff distances and ROE which tolerates no risk, keeping with the principle that there is no training worth life or limb to execute. In wartime we must factor in some risk to facilitate execution of missions. Study of **Army Regulations 385-62 and 385-63, Policies and Procedures for Firing Ammunition for Training, Target Practice, and Combat**, should be mandatory for all leaders. **Joint Pub 3-09.3, JTTP for the Employment of Close Air Support**, is an excellent start point to develop the staff's knowledge of CAS operations. Another good source of "wartime" considerations is the article **"Risk Estimate Distances (REDs) for Indirect Fires"** in the April-May 1997 issue of **Field Artillery**. (NOTE: The "REDs" article for artillery is based on indirect fires impacting perpendicular to the FLOT, whereas CAS ordnance "REDs" are based on bomb patterns which are parallel to the FLOT). These ammunition data used in conjunction with sound doctrinal graphic control measures (boundaries, air corridors, FSCMs, etc.) can ensure we employ sound fratricide prevention measures.



We also discussed "Indirect Control" and "Reasonable Assurance." These are defined within the **Joint Pub 3-09.3, JTTP for the Employment of Close Air Support**. However, the Joint Pub does not illuminate the considerations a Joint Force Commander must understand to allow "Reasonable Assurance (RA)" attacks. The fratricide discussions within the Close CAS Zone provide a great point of departure for listing those necessary considerations a commander must address to ensure ground forces safety, i.e., troop marking, target marking, relative location of friendly troops to target, criticality of the target, etc. For example, if I can't see the aircraft, then what electronic or visual methods can be employed to

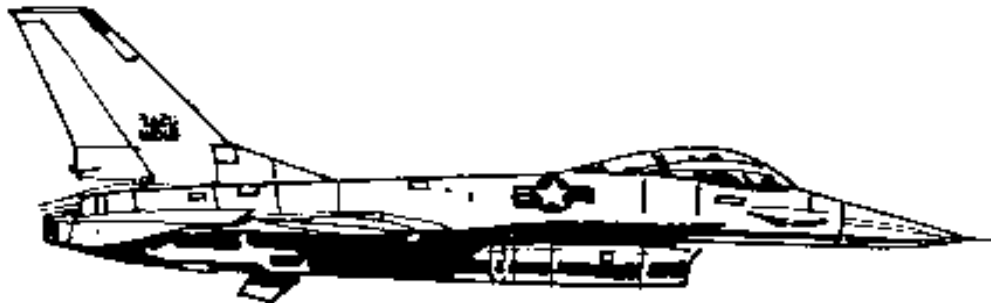
- a. positively mark/ID the target to the aircraft or
- b. mark ourselves so the aircraft can make a positive friendly ID.

Another way to consider an RA attack is to complete the phrase "I am reasonably sure we will not bomb friendly troops because...." Remember--*RA greatly increases the risk of fratricide* because there is no fail-safe friendly identification system. RA should only be used in cases where the target must be struck because it is *critical to mission success*. Unfortunately, the trend has been to execute RA-type attacks by default rather than design, and the relative risks have not been understood by the ground units.

## CHAPTER SUMMARY.

This discussion has focused on a method for dividing up the airspace in front of the Brigade Combat Team to identify those critical requirements necessary to execute safe, effective air strikes. This TTP is for reference only--current NTC ROE "rules the desert." Some have suggested dividing the battle space into just "Close" and "Deep" CAS, which is just as valid.

We must understand the risk factors associated with any air strike, fixed wing or helicopter.✪





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## **CHAPTER 3**

# **ALTITUDE DECONFLICTION OF ARTILLERY FIRES AND CLOSE AIR SUPPORT**

### **(TTP for the Employment of Simultaneous Fires)**

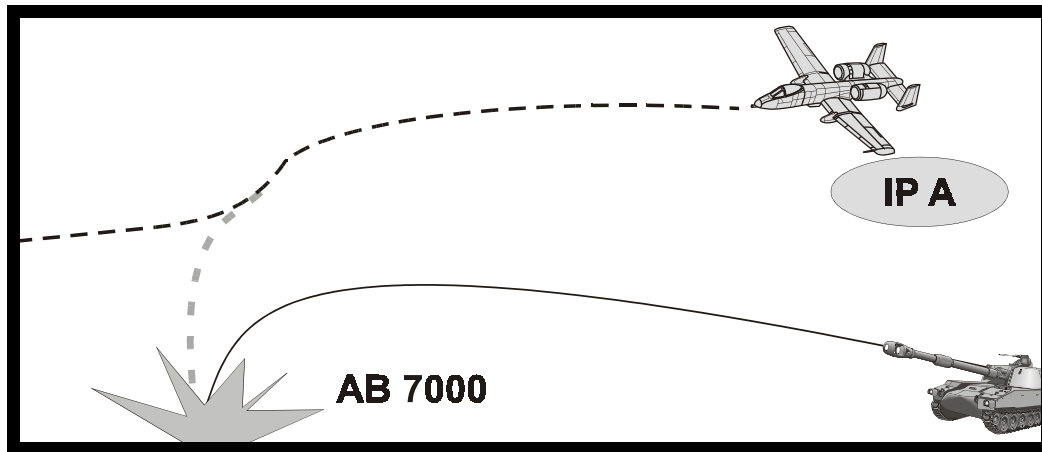
**A**ltitude separation, as a deconfliction method for separating indirect fires and CAS attacks, is often misunderstood and poorly executed at the National Training Center (NTC). A major contributor to this is the fact that there are not enough CAS tactics, techniques, and procedures (TTPs) between the Army and Air Force. This chapter introduces the new NTC CAS Rules of Engagement (ROE) and discusses the altitude deconfliction TTPs that were developed to support it.

NTC trainers received positive feedback from nearly every rotational unit when they employed CAS using altitude separation, especially during live-fire operations. The new ROE and TTPs were developed in response to that feedback. Under the old ROE only two methods of informal Airspace Coordination Areas (ACAs) were allowed in live fire, *lateral* and *time separation*. While these are appropriate techniques to utilize in many attack situations, they do not allow the massing of artillery and CAS against a common target without interruption of either system. The NTC, in conjunction with the USAF Air Warrior program at Nellis AFB, NV, has developed sound TTP and ROE to support safe, effective, coordinated artillery/CAS attacks.

Why use altitude separation? When suppressing or massing fires, it is sometimes desirable for the artillery to provide continuous fires on the CAS target or an air defense system. ***By establishing altitude and lateral separation control measures, you can ensure safe fighter clearance from the artillery trajectory and/or fragmentation patterns.***

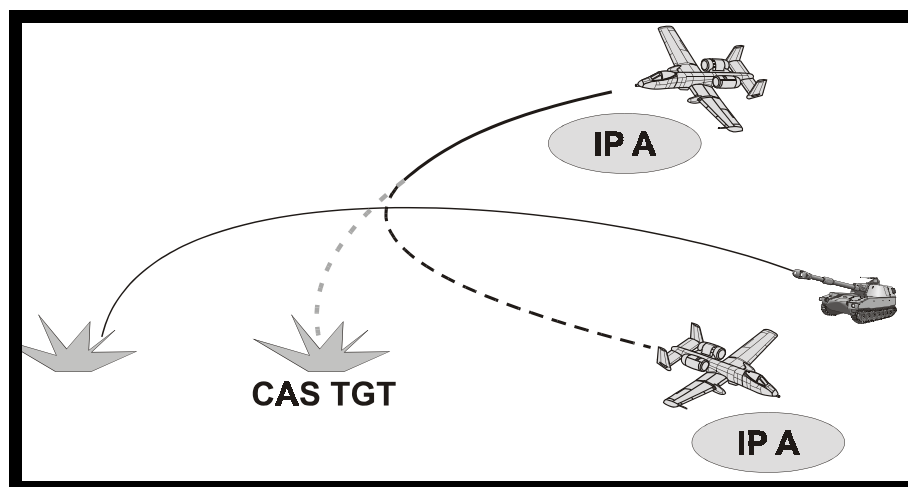
The NTC allows units to utilize altitude separation during live fire in *two distinct target attack situations*:

- a. When CAS and artillery attack the ***same target***; i.e., the same target grid is passed in the CAS 9-Line Brief and the artillery Call For Fire (CFF). See Figure 1. During this type of attack, CAS will be directed to stay 3,000 feet above ground level (AGL) or "ORD 1," whichever is higher.



**FIGURE 1. SAME TARGET ATTACK.** The fighter attacks from an IP "A" which is laterally separated from the artillery gun-target line and crosses the GTL at the target.

b. When CAS and artillery attack *separate targets* and the fighters must cross the artillery gun-target line (GTL). See Figure 2. During this type of simultaneous attack, the fighters are required to stay above the artillery GTL maximum ordinate with a 1,000-foot buffer added to it.



**FIGURE 2: SEPARATE TARGET ATTACKS, CAS TARGET ALONG ARTY GTL:** In this attack the fighter approaches from a lateral IP "A", crosses the GTL above the maximum ordinate + 1,000 feet, and exits to a different IP "T," again laterally separated from the GTL.



### ***Altitude Separation Rules of Engagement Highlights.***

- a. **General Requirements:** Units cannot establish a single maximum ordinate over their sector for an entire battle. Artillery high angle, rocket-assisted projectile (RAP) and mortar fires will not be separated by an altitude ACA. Use time or lateral separation methods only. Fixed-wing aircraft will not under-fly indirect fire gun target lines.
- b. **Artillery Requirements:** Altitude separation missions are coordinated by a time to target (TTT), sometimes called a time hack, or time on target (TOT). The first fire for effect (FFE) volley must impact not later than 30 seconds prior to the first aircraft on target. Other firing units cannot join in during the mission, and you cannot change the trajectories of those units participating in the mission.
- c. **Fighter Requirements:** Fighters must adhere to the final attack heading or attack zone passed to them by the final controller. Fighters will stay above the minimum bombing altitude passed to them by the final controller. To ensure the fighters remain above artillery fragmentation at the target area, the minimum altitude for any same target attack is 3,000 feet above ground level (AGL). **Note:** If "Ord 1" is determined to be higher than 3,000 feet AGL, then it is used as the CAS minimum bombing altitude. "Ord 1" is further defined below.

### ***Common Definitions.***

The term "**target area**" refers to the artillery target grid with a 1,000-meter radius around it. When conducting a *same target* attack, you must consider the effect of the artillery fragmentation and the height of the trajectory within 1,000 meters of the target.

An "**attack zone**" is a cone or a fan that fighters ingress and/or egress within as they attack the target. The attack zone left and right limits are defined to the fighters as two magnetic attack headings which form a fan or cone with its apex at the artillery target.

"**Ord 1**" refers to the altitude of any given artillery trajectory at a point 1,000 meters short of the target, with a 1,000-foot buffer added to that altitude. Ord 1 is calculated to provide a safe altitude for CAS to cross an artillery target area while conducting a same target attack.

**NOTE:** The 3,000 feet AGL rule is designed to provide an absolute safe minimum attack altitude for aircraft. This is based on the appropriate 155-mm HE vertical fragmentation pattern with a buffer added. (The vertical fragmentation pattern accounts for NTC's average ground altitude which is 2,000 to 3,000 feet MSL).

### ***DETERMINING "ORD 1."***

**Step 1:** Draw a line from the firing unit to the suppression target. Determine the GTL range and the vertical interval (VI) between the firing unit and its target.

**Step 2:** Determine the charge to be used. Find the appropriate Tabular Firing Table (TFT) trajectory chart for the selected charge. Determine the trajectory arc that will achieve the target range and will also account for the vertical interval. If the target falls between two trajectory arcs, then select the higher arc.



**Step 3:** Determine the altitude of the selected trajectory arc at a point 1,000 meters short of the target along the GTL. Convert the trajectory altitude from meters to feet by multiplying the altitude by 3.3. Add 1,000 feet to the converted altitude, the sum of these two numbers is Ord 1. Use this Ord 1 altitude or 3,000 feet AGL, whichever is higher as the CAS Stay Above (SA) Altitude for a *same-target* attack.

**Step 4:** Express the SA Altitude in feet MSL to the fighters by adding the target altitude to ORD 1.

### **EXAMPLE PROBLEM:**

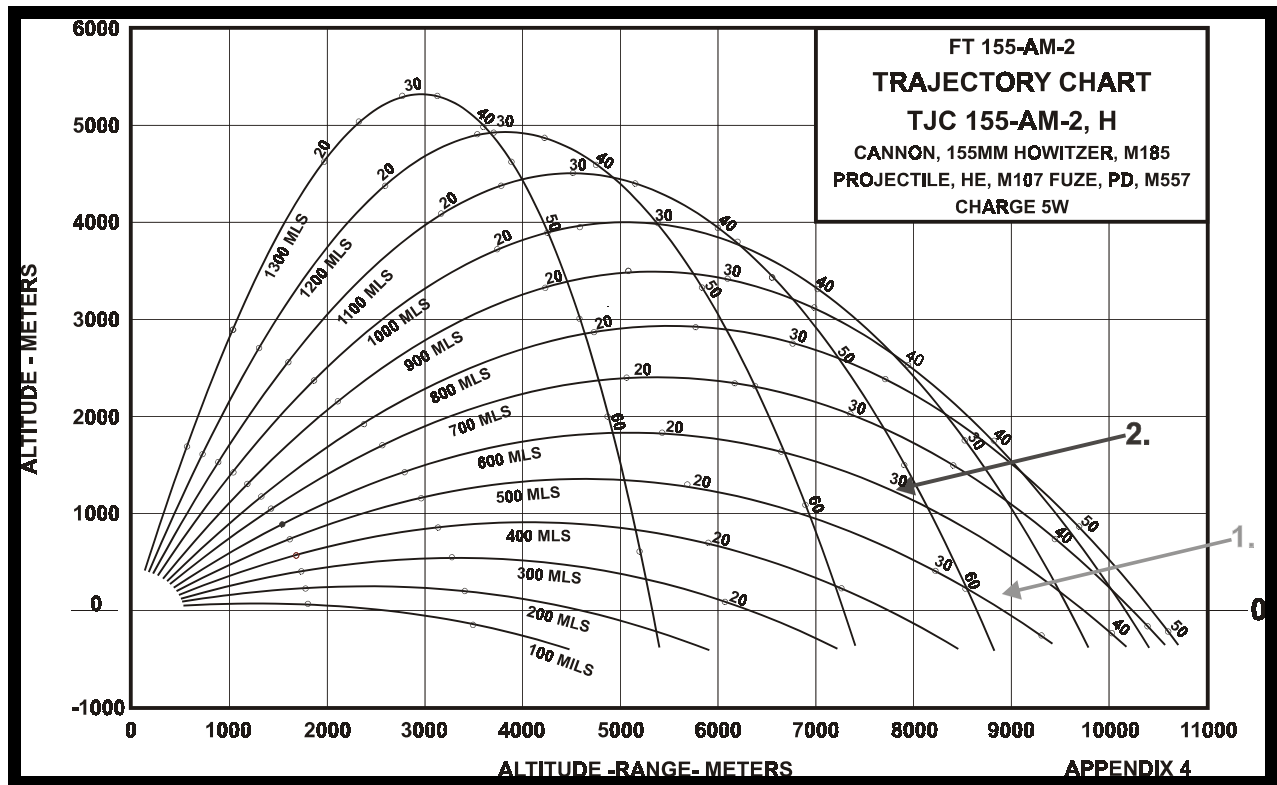
**NOTE:** Use the trajectory chart from the 155-mm HE, TFT (on the next page), in conjunction with this sample problem.

**Step 1.** GT Range = 8,900 meters, Firing Battery will use Charge 5 WB (White Bag), and the vertical interval (VI) is + 300 meters. (Compare where this plots on the TFT Chart; Number 1 is marked on the example below.)

**Step 2.** In this example you determine that you must use the 600 mil arc. The 600 mil arc is selected because the + 300 meter VI at range 8,900 meters puts the target plot above the 500 mil arc. Now that you know which arc to use, determine the altitude of the trajectory at a point 1,000 meters short of the target, i.e., 7,900 meters. At this range, the altitude of the trajectory plots 1,200 meters. (For a visual representation, look at where the Number 2 plots on the example TFT Chart below.)

**Step 3.** Remember you must convert this altitude of 1,200 meters to feet Above Ground Level (AGL). You do this by multiplying 1,200 by 3.3 which equals 3,960 feet. Now add 1,000 feet and you have ORD 1, 4,960 feet AGL. Always *round up* to the nearest 100 feet for ease of expression to the fighters, in this case you would pass 5,000 feet AGL to the ALO.

**Step 4.** The ALO must determine the stay-above altitude for the fighters by adding the target altitude to the ORD 1 they receive from the FSO. In this example, assume the target altitude was 2,300 feet; the ALO adds the 5,000 feet (Ord 1) to his 2,300-feet target altitude and passes a stay-above altitude of 7,300 feet Mean Sea Level (MSL).



### ***EXECUTING ALTITUDE SEPARATION MISSIONS.***

**Suggested Duties and Responsibilities.** The following tables provide the NTC-suggested responsibilities for executing altitude separation missions during same target and separate target attacks.



SAME TARGET ATTACK SUGGESTED DUTIES AND RESPONSIBILITIES		
<i>FSO</i>	<i>ALO</i>	<i>FDC</i>
SEAD CFF	IP/9-LINE	CHARGE
ORD 1	ATTACK HEADING/ZONE	RANGE
SA ALTITUDE (AGL)	SA ALTITUDE (MSL)	VERTICAL INTERVAL

SEPARATE TARGET ATTACK SUGGESTED DUTIES AND RESPONSIBILITIES		
<i>FSO</i>	<i>ALO</i>	<i>FDC</i>
SEAD CFF	IP/9-LINE	MAX ORDINATE
MAX ORD +1,000 FT	ATTACK HEADING/ZONE	
SA ALTITUDE (AGL)	SA ALTITUDE (MSL)	

Notice that the FSO initiates the mission by a "SEAD" Call for Fire (CFF). The SEAD CFF is not doctrinal, but it is essential to execution. The CFF that initiates an altitude separation mission must be distinguishable to all members of the fire support system to prevent a misunderstanding by one or more agencies. While altitude deconfliction **does** provide protection from the Direct Support and/or Reinforcing battalion artillery fires, it **does not** protect fighters from other indirect fires, i.e., mortars or division artillery fires. Use a lateral separation method to deconflict all "outside" indirect fires from the simultaneous mission. Thus the SEAD CFF tells the DS FA battalion that it is safe for their fires to continue throughout the CAS attack, even though the Fire Support Officer (FSO) has put "ACA Blue" into effect.

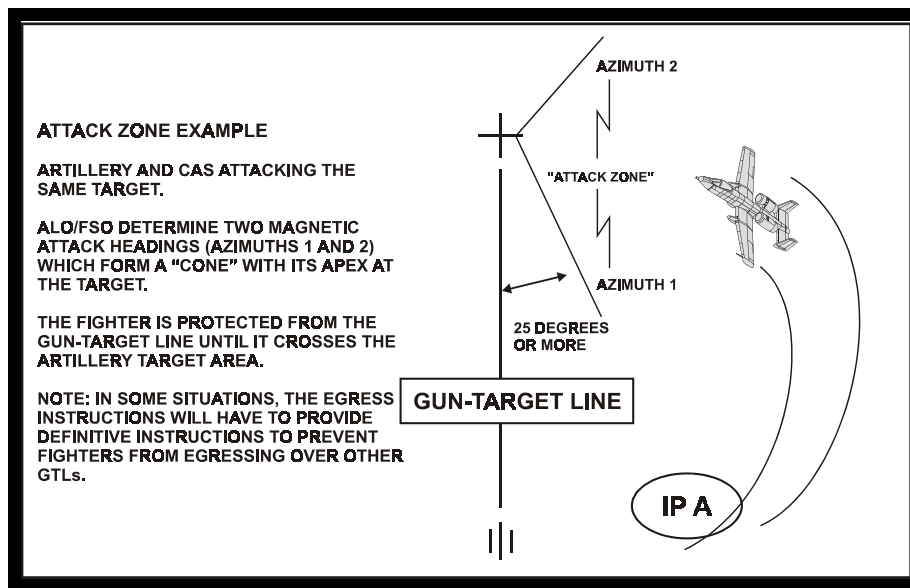
The SEAD CFF can also serve to standardize coordination of the mission by a few simple commands; for example, consider using the terms "Continuous" or "Interrupted" as a method of control. *Continuous* could imply that the first artillery rounds will begin impacting one minute prior to the CAS TOT and continue for three minutes. *Interrupted* could mean fires impact 30 seconds prior to CAS TOT, resume one minute after the TOT and continue for three minutes. This terminology simplifies fires coordination and speeds up CFF transmissions.

Earlier in this chapter we mentioned the use of *lateral and altitude separation techniques* to safely execute close in air strikes. To ensure lateral separation, set up the ingress and egress control measures so that the fighters will only cross the GTL at the artillery target (same target attack). A rapid method to translate the appropriate attack headings to the fighters is to give them an "attack zone." Attack Zones are procedural control measures used by doctrine to safe aircraft approach angles during (ground) laser-designated target attacks. They are also used in the altitude separation TTP to identify a safe zone for aircraft to ingress and egress in relation to artillery gun target lines. (Refer to Joint Pub 3-09.3 for a summary of laser attack zones).





The NTC ROE requires aircraft to approach the GTL on an azimuth greater than 25 degrees offset. This 25-degree separation allows for the rapid deconfliction of multiple GTLs (remember firing batteries consist of six or more guns, spread out).



*The benefits of attack zones are:*

- a. **Increased troop safety:** Using lateral separation in conjunction with an "IP Offset" from maneuver and indirect fire assets will help align aircraft away from friendly forces.
- b. **Better fire support coordination:** Offsetting IP to target attack headings will ease deconfliction of direct and indirect fires in relation to the aircraft ingress and egress. This is a *necessary control measure to compute altitude restrictions* for the aircraft as it crosses indirect GTLs.
- c. **Faster identification of targets by the pilot/aircrew:** The orientation that an attack zone provides can help the pilot visualize the friendly/enemy situation.
- d. **Improved acquisition of aircraft by TACPs:** Because the TACP designates the attack parameters, they can readily identify the fighters on ingress, thus speeding up the safety and clearance to drop/fire process. This is especially effective during night and low visibility conditions.

Attack zones should be as wide as possible without violating the 25-degree rule and/or jeopardize force safety. Assigning a single attack heading may be necessary for laser and night attacks to facilitate direct control, but it severely restricts aircraft flexibility and survivability.

## **SUMMARY.**

Although altitude separation is neither the silver bullet for simplifying CAS integration nor appropriate for all types of attacks, it is certainly a necessary airspace control measure to deconflict certain attacks. A unit with an established battle drill and thorough understanding of air operations will find that altitude separation can ease coordination for many attacks while achieving massing effects on the enemy.☺



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## CHAPTER 4

### CLOSE AIR SUPPORT PLANNING

#### (A TTP for Planning CAS Employment)

**T**he availability of Close Air Support (CAS) to the maneuver brigade offers the commander an extremely effective means to project combat power beyond the range of direct fire weapon systems. CAS, together with field artillery, electronic warfare, and engineer effort, forms the backbone of the brigade's deep operations--the portion of the battlefield in which favorable conditions can be set for the close fight. CAS gives the brigade significant flexibility and lethality in conducting deep operations which, when used in concert with other deep attack systems, can have a devastating effect on the enemy. Sadly, the full effects of CAS are rarely achieved during a campaign at the National Training Center (NTC).

Throughout a campaign, a brigade's efforts to employ CAS are routinely thwarted by a number of factors. These include: multiple target grids generated from a variety of sources, ineffective airspace deconfliction, lack of SEAD (both lethal and non-lethal), and lack of qualified terminal air controllers at the right place and at the right time. Gradually, integrating CAS into the operation becomes viewed as "too hard to do." **Indeed, CAS is too hard to do with little or no prior planning or poor execution training.** Generally, the brigade **intends** to employ CAS but does not **plan** to employ CAS. The transition from intent to planning is obviously the key to success. Unfortunately, precious few tactics, techniques, and procedures (TTPs) exist to assist the brigade in planning for CAS employment. This chapter presents step-by-step TTPs developed at the NTC for CAS employment.

**STEP 1:** The targeting team determines, from the commander's intent, what enemy formation and function they need to attack with CAS. Once this is determined, the process of identifying where to target CAS during the operation can begin. Be sure to synchronize the proposed target locations with current and proposed targeting products of the Intelligence Preparation of the Battlefield (IPB) process and scheme of maneuver (i.e., TAIs, DPs, EAs, HVTs, etc.). Consider all options (branches and sequels) from the wargame process and condense the numerous potential air strike options into as few as possible. This will serve to focus your planning efforts within a constrained planning timeline and should provide a catalyst for massing multiple systems for the obvious advantages of mutual support and massing of fires.

**STEP 2:** Graphically portray the potential CAS targets on the fire support overlay. A standard target symbol can be used as long as it is easily distinguishable from an artillery target. A different color (blue for example) may be used or CAS and annotated in the upper right quadrant of the target symbol. This different color is only to highlight the target for all members of the staff *and doesn't necessarily have to be a separate target from a planned artillery target*. Also, do not get fixated on a single six-digit grid point because CAS (FAC-As in particular) will use that grid as a start point for an area search. In the desert, a FAC-A can potentially see 10 to 20 or more square kilometers of real estate at a time (numerous enemy formations or positions), so you need to focus his search. Once CAS has identified the correct enemy to engage, they can then adjust accordingly.



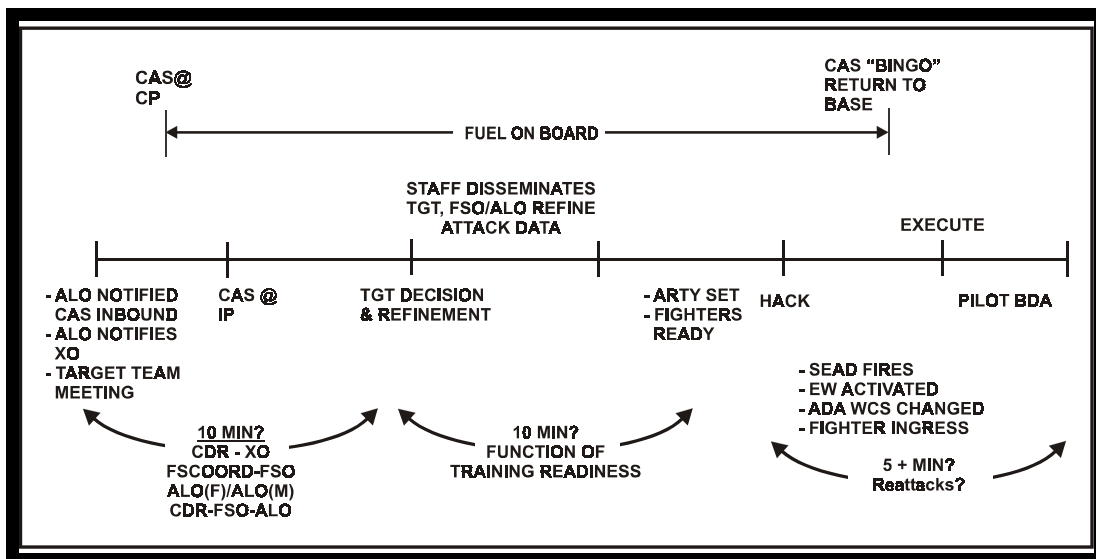
**STEP 3:** Construct a CAS Target Box (CTB) for each CAS target area which is not defined by a standard doctrinal targeting term, i.e., EAs, TAIs, etc. The remarks of the CAS Target Card (Step 5) should contain details of the EA or CTB and the target in which the particular enemy formation could be found based on the course of action for which the target area was developed. Although we anticipate engaging the enemy at the CAS target, the remarks will define the area within which:

- 1) we can expect to find the enemy,
- 2) we have the capability to engage the enemy, and,
- 3) we can achieve the desired effects on the enemy.

Compose a 9-line for each CAS target. You can expect to update some data prior to actual execution, but this will save a tremendous amount of time during the mission coordination and briefing process.

**STEP 4:** This is the final step in construction of the CAS components of the fire support overlay. The components include ACAs, IPs, FSCMs (current and planned), artillery firing positions (current and planned), ADA, and Army airspace command and control (A<sup>2</sup>C<sup>2</sup>). Although some of these components are common to the fire support overlay, the combination of these graphics will greatly enhance the deconfliction of systems and fires prior to the battle. Graphically portray the triggers or decision points for each CAS target area (EA, CTB, etc.).

**Note:** The trigger to bring CAS onto a specific target area should not be confused with a trigger to launch "strip alert" planes or to request "immediate CAS." The trigger to bring CAS on station is included on a synchronization matrix and is computed-based on how long it will take to get fighters to an IP. The trigger or decision point we are focused on is that point (location) the enemy formation reaches which activates a particular target area for the engagement. The trigger must be far enough from the target area to allow enough time to execute a variety of tasks associated with the attack into the CAS Target Area. Consider what tasks must be accomplished using the following timeline.





The timeline is based on NTC rotational averages for brigades over the previous year. Normal time from contact with fighters to actual execution is 20 minutes. Many attacks have gone "Bingo" before even getting a target approved. Appendix A of FM 6-20-10, *The Targeting Process*, contains good time planning data for placement of decision points.

**STEP 5:** Construct CAS Target Cards for each CAS target area. CAS Target Cards are 5X8 cards containing vital information regarding a CAS mission against a specific target in a specific target area. A separate CAS Target Card should be developed for each EA, TAI, CTB, Enemy battle position, etc. The CAS Target Card is the tool for the detailed planning of CAS. It serves as the planning checklist for a particular CAS engagement. The obvious benefit is that the details are addressed during the planning process, and we will not be forced to figure out ACAs, SEAD, control, and the like during the execution of the mission. The CAS Target Cards should be disseminated to all fire support elements and the artillery battalions (DS and R). The line number/row number reference system permits efficient updates during planning, preparation (rehearsals), and execution (e.g., change Line 3B of CAS Target Card No. 1 from DS Battalion, one round DPICM to DS Battalion, one round HE/PD). An example of information on a CAS Target Card with a legend explaining line entries is shown below.

TRIGGER: CAS TARGET CARD NO.		
LINE	A	B
1	TARGET GRID: TARGET ALT:	TARGET DESCRIPTION:
2	ACA:	CONTROL: ALTERNATE:
3	SEAD TARGET: NON-LETHAL:	METHOD OF FIRE/CONTROL:
4	IP:	IP-TARGET TIME:
5	INGRESS/EGRESS: OFFSET: L or R	ATTACK ZONE: STAY ABOVE ALT:
6	EFFECTS:	MARKING:

#### CAS Target Card Legend:

**Trigger:** The enemy formation and location which will cause us to employ CAS into the EA, CTB, etc. This trigger must be located far enough from the target area to allow sufficient time to set the conditions for CAS (Target approval, ACA disseminated, Staff dissemination, SEAD, etc). The trigger will also alert us as to which target area the enemy is approaching. If the trigger is located at a point that the enemy commander has more than one option in his route (i.e., a road intersection at which he can go northwest or southwest), the trigger becomes a decision point for us as well.



**CAS Target Card No:** This number is used for ready reference by all agencies to synchronize planning and updating of attack information. The card is built to support an attack against the enemy formation identified in Line 1B.

**Line 1A:** UTM grid and altitude in feet MSL for the CAS Target.

**Line 1B:** The enemy formation and disposition (moving, dug-in, etc.) that CAS will attack.

**Line 2A:** The Airspace Coordination Area that is planned for this particular target area. Include code names and grids.

**Line 2B:** Call sign and location of primary and backup controllers who will have final control for the attack. Ground FACs located with friendly forward elements are probably the best terminal controllers for close engagements to prevent fratricides.

**Line 3A:** UTM grid for planned SEAD. The grid may be refined as intelligence information is gathered. If artillery is providing SEAD, include the artillery target number. If another system (Army Aviation, USAF), then indicate the system. If non-lethal SEAD is planned (jamming, AEW, etc.) indicate the system and its effects.

**Line 4A:** Initial Point. A well-defined point which is easily distinguishable visually or electronically, used as a starting point for the fighters on their attack run against the target. The IP should be deconflicted from firing battery/mortar locations (i.e., not over them or directly in front of them). The IP works best for deconfliction of indirect fire gun-target lines and aircrew orientation to friendlies if it is lateral to the BCT zone or sector.

**Line 4B:** The time, in minutes and seconds, that the aircraft will take to fly from the IP to the target. The time will vary significantly by type of aircraft. This time is important when planning SEAD fires; it can help determine how long ACAs will probably be in effect, how long friendly ADA systems will be at a more restricted condition (i.e., "yellow, hold") and what influence the airstrike may have on the scheme of fires.

**Line 5A: Ingress/Egress:** The ingress and egress routes an aircraft may be required to follow. It is used to describe approach, abort, and exit instructions for the target attack. Offset Left or Right: Offsets (in conjunction with attack zones) increase ground troop safety, help the fires coordination process, orient aircrews onto targets faster and help TACPs identify the attacking aircraft faster (especially at night).

**Line 5B: Attack Zone:** Is two magnetic headings given to the aircraft which forms a "cone" with its apex at the CAS Target (see Altitude Separation TTP article for a more in-depth discussion of an attack zone). It is used to orient aircraft onto attack headings which facilitate final control, deconfliction, time, lateral and/or altitude separation efforts. Stay Above Altitude is the minimum altitude aircraft can fly over the target area when conducting altitude separated attacks. It is determined by the effects of fires (i.e., the bursting radius of high explosive ordnance or the maximum ordinate indirect fire gun-target line trajectories).

An example of Line 5A and B might be: "Use ACAs Blue and White for ingress, attack zone is 35 to 100 degrees magnetic, offset left, stay above 4,500 feet MSL, egress west then north back to IP Tango on ACA Blue."

**Line 6A:** The effects desired on the target from this attack. (The desired effects helps determine type of munitions and number of sorties required to execute.)

**Line 6B:** The method of marking the target that will be used (white phosphorus, laser spot, etc.). If laser spot is to be used, indicate who will provide the spot (COLT, OH-58D, etc.) Also remember the attack zone for a laser attack is restrictive and doesn't necessarily conform to the altitude separation TTP offered in Chapter 3. Refer to **J-Pub 3-09.1, Joint Laser Designation Procedures**, and **J-Pub 3-09.3, JTTP for the Employment of CAS**, for in-depth information on laser marking requirements and techniques.



**STEPS 1 through 5** outline a planning technique for employment of CAS. *This technique incorporates planning considerations which are necessary for well-executed, timely, "first pass" fighter attacks.* In execution, these tools are used to bring CAS to bear on the battlefield, with minimum confusion and delay.

A Sample CAS Target Card filled out (**items in bold print**) with each meaning follows.

<b>TRIGGER: NAI 5</b>			<b>CAS TARGET CARD No. 5</b>		
<b>LINE</b>		<b>A</b>		<b>B</b>	
<b>1</b>		TARGET GRID: <b>NK 404224</b> TARGET ALT: <b>3,960</b>		TARGET DESCRIPTION: <b>ARMOR, MOVING EAST</b>	
<b>2</b>		ACA: <b>TEXAS, NO FIRES WEST OF 43 N-S GRID LINE</b>		CONTROL: <b>RAVEN 10</b> ALTERNATE: <b>FAC-A</b>	
<b>3</b>		SEAD TARGET: <b>NK 423215 (2S6)</b> NON-LETHAL: <b>56th MI JAM MRR COMMAND NET</b>		METHOD OF FIRE/CONTROL: <b>ONE BTRY, HE/VT;</b> <b>CONTINUOUS;</b> <b>CAS TOT 1515</b>	
<b>4</b>		IP: <b>Z (T IS ALTERNATE)</b>		IP-TARGET TIME: <b>1 MIN, 15 SEC</b>	
<b>5</b>		INGRESS/EGRESS: <b>N OF 24 E-W/BACK TO IP Z</b> OFFSET: <b>L or R</b>		ATTACK ZONE: <b>220 - 105 MAG</b> STAY ABOVE ALT: <b>N/A</b>	
<b>6</b>		EFFECTS: <b>DESTROY THREE CBT VEHS</b>		MARKING: <b>COLT 3, NK 426237, LASER SPOT IF NECESSARY</b>	

In this example, the card was developed for engagement of the lead MRB of an attacking MRR at CAS 1. When the lead MRB was acquired (at trigger NAI 5, as in this example), the Fire Support Officer announced that CAS 1 was activated and all fire supporters referred to CAS Target Card No. 1 for coordinating data. The controlling Tactical Air Control Party (TACP) (RAVEN 14) knew he would control.

The 2S6 ADA system was acquired visually by COLT 3 so Line 3 (SEAD target grid) was quickly updated to suppress the latest known ADA threat. By referring to Line 3, all executors are quickly updated by the FSO with SEAD refinement data; the FSE, IEWSO and FDC knew the ACA and intent for SEAD. In this case, "Continuous" in Line 3B is a SOP standard suppression mission where the artillery battery fired a sustained rate of from -1 to +2 based on the CAS TOT. (Another key point is on Line 2a, ACA "TEXAS." The SEAD CFF "continuous" allows the SEAD battery to "violate" this ACA; all other fire support agencies cannot fire into ACA TEXAS.)

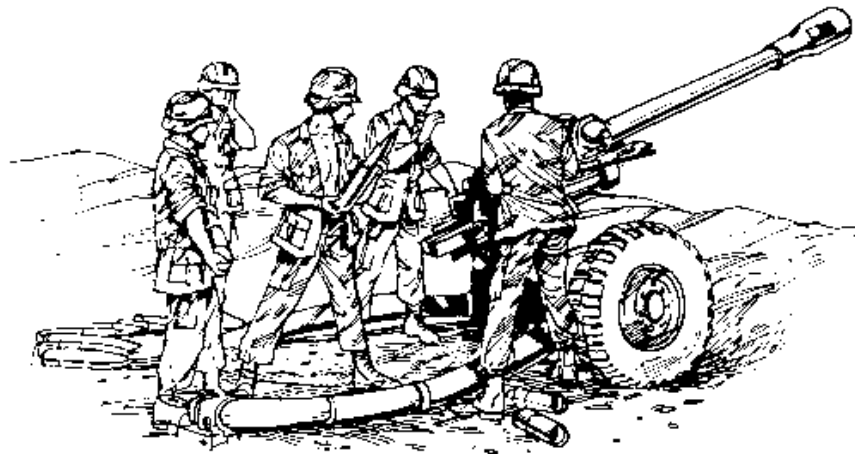


No stay above altitude was given (Line 5B) because the artillery and CAS targets were laterally separated. The ACA instructions (Line 2A) in conjunction with the instructions to the fighters (Lines 5A and B) served to deconflict the simultaneous engagement of the artillery against the 2S6 and the CAS against the MRB. The Air Defense Officer coordinated his weapons control status based on the TOT to minimize the BCT's ADA exposure. The 9-line CAS briefing was completed by extracting the data from the card.

### **SUMMARY.**

This chapter has explored some TTPs for rapidly employing CAS on the battlefield. Regardless of the technique used, *thorough planning is the only way to ensure success*. Fire support overlays and CAS Target Cards offer one way to systematically walk through the *planning* process and serve as a checklist for the planners. As an additional benefit, the CAS Target Cards truly are planning documents that can be used during execution. The "what-to-coordinate" data discussed in this chapter is vital to planning CAS employment and should be studied, included in SOP, and trained.

**Note:** This is a modified version of an article written by (then CPT) MAJ Samuel R. White, Jr., "A *Technique for the Employment of Close Air Support (CAS)*." It was originally printed in **CALL Newsletter No. 95-10**, Jul 95, *National Training Center's "Fighting with Fires II."* The TTPs offered in that article and the planning sequence example are superb and worth studying. ⚡





## **Appendix A**

### **PROBLEMS AND SOLUTIONS**

#### **PROBLEM No. 1 (USE MAP No. 1.)**

##### ***SITUATION:***

TARGET AH7005 IS A MOTORIZED RIFLE PLATOON (MRP) (+) LOCATED AT NK 330274.  
A/BTRY IS LOCATED AT NK450245 AND WILL PROVIDE SEAD AND MARKING ROUNDS  
USING HE/CHARGE 7 WHITE BAG.  
B/BTRY IS LOCATED AT NK463253 AND WILL PROVIDE SEAD USING CHARGE 7 WHITE BAG.  
C/BTRY IS MOVING.  
COLT 4 IS LOCATED AT 377315 WITH AN ETAC.  
TASK FORCE MORTARS ARE AT NK441291.  
TASK FORCE FLOT IS THE 43 N/S GRIDLINE; LD IS 0700.  
IP ZULU IS AT NK4431.  
CAS TOT IS 0645.

##### ***MISSION:***

PROVIDE UNINTERRUPTED SUPPRESSION FIRES ON THE MRP (+) BY MASSING THE TWO  
BATTERIES AND SAFELY DECONFLICTING CAS ON THE SAME TARGET BY CALCULATING THE  
STAY-ABOVE ALTITUDE USING ORD 1.

##### ***DETERMINE:***

9-LINE BRIEF, SEAD CALL FOR FIRE, AND ANY OTHER APPROPRIATE SITUATIONAL  
UPDATE INFORMATION FOR THE CAS DEEMED NECESSARY.

##### ***9-LINE:***

1. IP/AP \_\_\_\_\_
2. HDNG \_\_\_\_\_
3. DISTANCE \_\_\_\_\_
4. TGT ELEV \_\_\_\_\_
5. TGT DISC \_\_\_\_\_
6. TGT LOC \_\_\_\_\_
7. MARK TYPE \_\_\_\_\_
8. FRIENDLIES \_\_\_\_\_
9. EGRESS \_\_\_\_\_



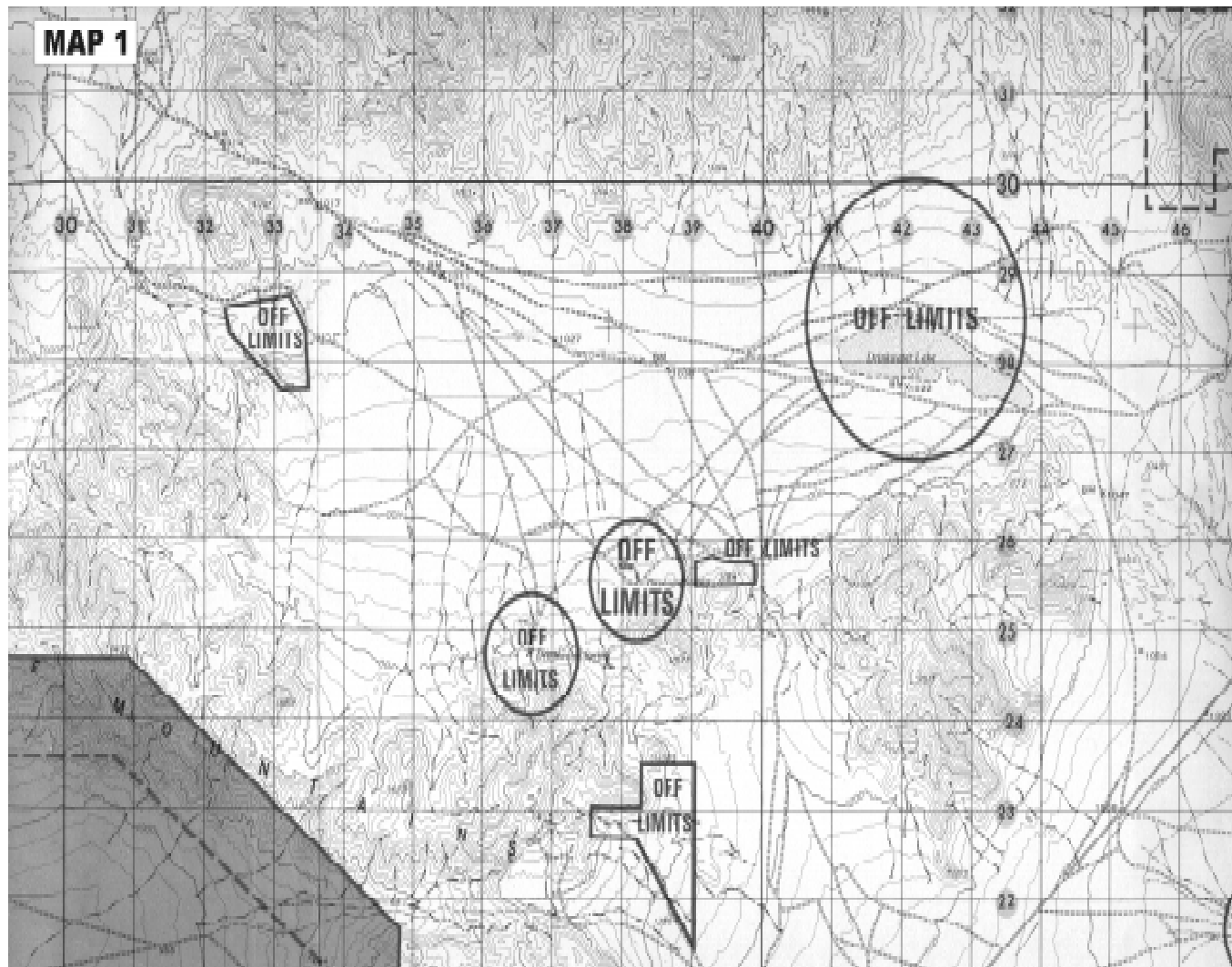


**REMARKS:**

THREATS \_\_\_\_\_ HAZARDS \_\_\_\_\_ WEATHER \_\_\_\_\_  
ORDNANCE DELIVERY \_\_\_\_\_ FINAL ATTACK HEADING OR ATTACK ZONE \_\_\_\_\_  
HEADINGS \_\_\_\_\_ ALTITUDE RESTRICTIONS \_\_\_\_\_ ACA \_\_\_\_\_  
BATTERY LOCATION \_\_\_\_\_ MORTAR \_\_\_\_\_ LOCATION \_\_\_\_\_  
TOT \_\_\_\_\_ OTHER: \_\_\_\_\_

**SEAD CALL FOR FIRE:**

\_\_\_\_\_ DE \_\_\_\_\_ OVER.  
FFE GRID \_\_\_\_\_ OVER.  
TGT DESC \_\_\_\_\_  
CAS TOT \_\_\_\_\_





## **PROBLEM No. 1 SOLUTION (USE MAP No. 1.)**

### ***SITUATION:***

TARGET AH7005 IS A MOTORIZED RIFLE PLATOON (MRP) (+) LOCATED AT NK 330274.  
A/BTRY IS LOCATED AT NK450245 AND WILL PROVIDE SEAD AND MARKING ROUNDS  
USING HE/CHARGE 7 WHITE BAG.  
B/BTRY IS LOCATED AT NK463253 AND WILL PROVIDE SEAD USING CHARGE 7 WHITE BAG.  
C/BTRY IS MOVING.  
COLT 4 IS LOCATED AT 377315 WITH AN ETAC.  
TASK FORCE MORTARS ARE AT NK441291.  
TASK FORCE FLOT IS THE 43 N/S GRIDLINE; LD IS 0700.  
IP ZULU IS AT NK4431.  
CAS TOT IS 0645.

***MISSION:*** PROVIDE UNINTERRUPTED SUPPRESSION FIRES ON THE MRP (+) BY MASSING THE TWO BATTERIES AND SAFELY DECONFLICTING CAS ON THE SAME TARGET.

***DETERMINE:*** 9-LINE BRIEF, SEAD CALL FOR FIRE, AND ANY OTHER APPROPRIATE SITUATIONAL UPDATE INFORMATION FOR THE CAS DEEMED NECESSARY.

### ***9-LINE:***

1. IP/AP **ZULU**
2. HDNG **239 DEGREES MAGNETIC** OFFSET L \_\_\_\_\_ R **X**
3. DISTANCE **6.8 NM**
4. TGT ELEV **3,400 FT**
5. TGT DISC **ARMOR, DUG-IN**
6. TGT LOC **NK330274**
7. MARK TYPE **HE, 1 RD WP**
8. FRIENDLIES **10 K EAST, COLT/ETAC 4 @ NK377315**
9. EGRESS **WEST THEN NORTH TO IP ZULU**

### ***REMARKS:***

THREATS SA **14** HAZARDS **N/A** WEATHER **80 OVC 7+** DELIVERY ORDNANCE **MK-82 HD**  
FINAL ATTACK HEADING OR ATTACK ZONE HEADINGS **240 & 115 DEG MAG** ALTITUDE  
RESTRICTIONS **STAY ABOVE 8,400 FT MSL ACA NO FIRE WEST OF 35 EXCEPT DS ARTY AT CAS**  
TGT BATTERY LOCATION **NK450245/NK 463253** MORTAR LOCATION **510215** TOT **0645L** OTHER:  
**INGRESS BETWEEN 240 AND 115 MAG; DO NOT FLY SOUTH OF IP TO TGT HEADING FOR**  
**EGRESS.**



***SEAD CALL FOR FIRE:***

**THUNDER DE STRIKER 4 OVER.**

**FFE GRID NK330274 OVER.**

**TGT DESC T80/BMPS DUG-IN; CONTINUOUS SEAD; CAS TOT 0645. OVER.**

**STAY-ABOVE ARTILLERY CALCULATION.** (B/BTRY IS USED BECAUSE IT HAS THE LONGER RANGE TO TARGET.)

**RNG TO TGT: 13,400M; CHG: 7WB; VI: -10 (BTRY 1040, TGT 1030); FOR ORD 1, USE 600 MIL ARC:**

**ALTITUDE @ 12,400M = 1,200M; X 3.3 = 3,960FT; + 1,000FT = 4,960FT; = ~ 5,000 FT AGL/8,400 FT MSL.**

**(CONTINUOUS SEAD MEANS ARTY WILL FIRE FROM CAS TOT - 1:00 TO + 1:00 MINUTES.)**



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## **PROBLEM No. 2 (USE MAP No. 2.)**

### ***SITUATION:***

TARGET AH7005 IS A PLATOON OF T-80s LOCATED AT NK 404224.

TARGET AH7103 IS A 2S6 LOCATED AT NK423215.

A/BTRY IS LOCATED AT NK502237 AND WILL PROVIDE SUPPRESSION AND MARKING ROUNDS USING HE/CHARGE 7 WHITE BAG ON AH7005.

B/BTRY IS LOCATED AT NK509226 AND WILL PROVIDE SEAD ON THE 2S6 AH7103, USING CHARGE 7 WHITE BAG.

C/BTRY IS MOVING.

TASK FORCE MORTARS ARE AT NK510215.

TASK FORCE FLOT IS THE 50 N/S GRIDLINE; LD IS 1030.

CAS HAS MK-82 LD ORDNANCE.

IP WHISKEY IS AT NK5130.

CAS TOT IS 1000.

### ***MISSION:***

PROVIDE UNINTERRUPTED SUPPRESSION FIRES ON THE 2S6, SUPPRESSIVE FIRES WITH MARKING ROUNDS ON THE T-80s AND SAFELY DECONFLICT CAS ON TARGET AH7005 BY CALCULATING THE STAY-ABOVE ALTITUDE USING ORD 1.

### ***DETERMINE:***

9-LINE BRIEF, SEAD CALL FOR FIRE, AND ANY OTHER APPROPRIATE SITUATIONAL UPDATE INFORMATION FOR THE CAS DEEMED NECESSARY.

### ***9-LINE:***

1. IP/AP \_\_\_\_\_
2. HDNG \_\_\_\_\_
3. DISTANCE \_\_\_\_\_
4. MTGT ELEV \_\_\_\_\_
5. TGT DISC \_\_\_\_\_
6. TGT LOC \_\_\_\_\_
7. MARK TYPE \_\_\_\_\_
8. FRIENDLIES \_\_\_\_\_
9. EGRESS \_\_\_\_\_

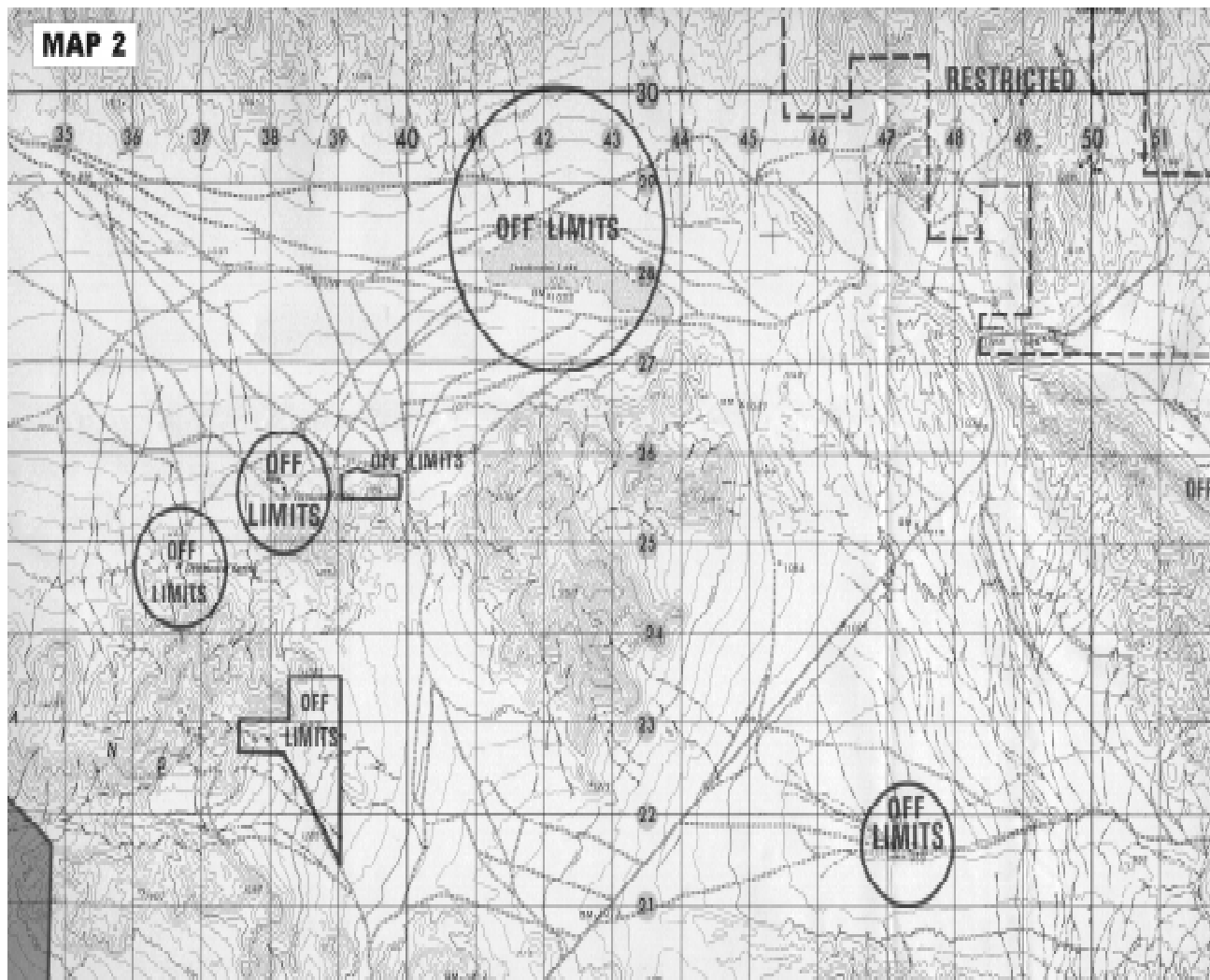


**REMARKS:**

THREATS \_\_\_\_\_ HAZARDS \_\_\_\_\_ WEATHER \_\_\_\_\_  
ORDNANCE DELIVERY \_\_\_\_\_ FINAL ATTACK HEADING OR ATTACK ZONE \_\_\_\_\_  
HEADINGS \_\_\_\_\_ ALTITUDE RESTRICTIONS \_\_\_\_\_ ACA \_\_\_\_\_  
BATTERY LOCATION \_\_\_\_\_ MORTAR \_\_\_\_\_ LOCATION \_\_\_\_\_  
TOT \_\_\_\_\_ OTHER: \_\_\_\_\_

**SEAD CALL FOR FIRE:**

\_\_\_\_\_ DE \_\_\_\_\_ OVER.  
FFE GRID \_\_\_\_\_ OVER.  
TGT DESC \_\_\_\_\_  
CAS TOT \_\_\_\_\_





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## **PROBLEM No. 2 SOLUTION (USE MAP No. 2.)**

### ***SITUATION:***

TARGET AH7005 IS A PLATOON OF T-80s LOCATED AT NK 404224.

TARGET AH7103 IS A 2S6 LOCATED AT NK423215.

A/BTRY IS LOCATED AT NK502237 AND WILL PROVIDE SUPPRESSION AND MARKING ROUNDS USING HE/CHARGE 7 WHITE BAG ON AH7005.

B/BTRY IS LOCATED AT NK509226 AND WILL PROVIDE SEAD ON THE 2S6 AH7103, USING CHARGE 7 WHITE BAG.

C/BTRY IS MOVING.

TASK FORCE MORTARS ARE AT NK510215.

TASK FORCE FLOT IS THE 50 N/S GRIDLINE; LD IS 1030.

CAS HAS MK-82 LD ORDNANCE.

IP WHISKEY IS AT NK5130.

CAS TOT IS 1000.

### ***MISSION:***

PROVIDE UNINTERRUPTED SUPPRESSION FIRES ON THE 2S6, SUPPRESSIVE FIRES WITH MARKING ROUNDS ON THE T-80s AND SAFELY DECONFLICT CAS ON TARGET AH7005 BY CALCULATING THE STAY-ABOVE ALTITUDE USING ORD 1.

### ***DETERMINE:***

9-LINE BRIEF, SEAD CALL FOR FIRE, AND ANY OTHER APPROPRIATE SITUATIONAL UPDATE INFORMATION FOR THE CAS DEEMED NECESSARY.

### ***9-LINE:***

1. IP/AP **WHISKEY.**
2. HDNG **221 DEGREES MAGNETIC** OFFSET L \_\_\_\_\_ R **X.**
3. DISTANCE **8 NM.**
4. TGT ELEV **3,960 FT.**
5. TGT DISC **ARMOR, T-80 STATIONARY.**
6. TGT LOC **NK404224.**
7. MARK TYPE **WP.**
8. FRIENDLIES **9.5 K EAST.**
9. EGRESS **WEST THEN NORTH BACK TO IP WHISKEY.**





**REMARKS:**

THREATS **2S6/SA-16** HAZARDS **N/A** WEATHER **080 OVC 7+** ORDNANCE DELIVERY **MK-82 LD** FINAL ATTACK HEADING OR ATTACK ZONE HEADINGS **220 & 105 DEG MAGNETIC** ALTITUDE RESTRICTIONS **STAY ABOVE 8,300 FT MSL** ACA **NO FIRE WEST OF 42 N/S GRIDLINE** BATTERY LOCATION **502237/509226** MORTAR LOCATION **510215** TOT **1000** OTHER:

**SEAD CALL FOR FIRE:**

**THUNDER DE TIGER** OVER.

FFE GRID **AH7005** OVER.

TGT DESC **4 T-80s** STATIONARY; CAS TOT **1000**; CONTINUOUS **3:00** MINUTES, MARK WITH ONE ROUND WP.

(ALSO INITIATE SEAD TARGET AH7103.)

A/BTRY RANGE TO TARGET = **10,000M**; CHARGE **7WB**; VI **+200** (BTRY ALT **1000**, TGT ALT **1200**); ARC **400m**. ALTITUDE @ **1,000M** = **1,100M**; X **3.3** = **3,300 FT**; **+1,000FT** = **4300FT** AGL/ **8,300FT** MSL.



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## **APPENDIX B**

### **National Training Center Close Air Support Rules of Engagement**

The National Training Center Close Air Support Rules of Engagement (ROE), 26 October 1996, are provided for reference. The safety considerations of direct and indirect fires for execution are still valid. Commanders and staffs are to consider all of the instructions contained within these ROE when deciding risk for any operation. The difference in wartime may be the use of published Risk Estimate Distances instead of Minimum Safe Distances for example. **CAUTION:** These ROE may be superseded in the future and units should verify they have the most current version when conducting a rotational trainup.

DEPARTMENT OF THE ARMY  
Operations Group, National Training Center  
Fort Irwin, California 92310-5031

ATXY-O-Z-FSE (385-10e)

26 OCT 96

MEMORANDUM FOR ALL OPERATIONS GROUP TEAMS

SUBJECT: Live Fire Rules of Engagement for Employment of Close Air Support (CAS).

1. **PURPOSE:** This memorandum provides a consolidated listing of Rules of Engagement (ROE) for CAS operations in Live Fire and supersedes the NTC ROE, 26 February 1996, and Live Fire CAS ROE Memorandum, 25 January.

2. **CLOSE AIR SUPPORT LIVE FIRE RULES OF ENGAGEMENT.**

a. **General:** The tactical employment of CAS will be under Brigade and Task Force command and control in accordance with TAC Regulation 55-26, AR 385-62, applicable TMs, and interservice agreements. Airspace management is the responsibility of the Live Fire TOC (DTAC). Fixed-wing aircraft will be employed at 300 feet above ground level (AGL) and higher.

(1) TACPs/FAC-As involved with each CAS attack will coordinate 9-lines to the fighters prior to fighters departing the IP/CP. TACPs/FAC-As will consider for each attack the FLOT, forward friendlies (i.e., COLTs, scouts, etc.), ACAs, battery and mortar locations, active GTLs, target description and coordinates, ingress and egress instructions (i.e., attack heading and restrictions), actual ordnance to be delivered, and type of mark on the target.

(2) Each fighter must be cleared to the IP, cleared to depart the IP and cleared onto the target individually by a qualified final controller (GFAC/FAC-A/ALO). If a fighter does not receive "cleared hot," the pilot cannot release ordnance.

b. **Direct Fire:** CAS is deconflicted from direct fire systems by Surface Danger Zones (SDZs) and Vertical Danger Zones (VDZs). By combining the dimensions for these two zones for the most dangerous direct fire system (usually the M1A1, 120-mm gun), you derive the horizontal and vertical hazard area for ricochets. For simplicity these two zones combined are referred to as the *Ricochet Danger Zone (RDZ)*.



(1) The dimensions of the RDZ for NTC Live Fire operations are: 7,500 meters long, equal to the width of all range fans combined, and 5,000 feet high. To determine the width, plot the left limit and right limit of direct fire fans (using the M1A1, 120-mm gun, range fan) and then measure the distance between the limits at the widest point. The RDZ is applied from the front line of firing elements; i.e., maneuver company/teams, counter-reconnaissance screens, etc. (See Figure A). (Figure A is not included in this excerpt.)

(2) Direct fires may continue against surface targets as long as aircraft remain stay above 5,000 ft (AGL) within specified direct fire VDZs. Friendly positions must be clearly marked or identified (i.e., with respect to identifiable terrain). Red Air (RCMATs) will not be employed when CAS is on station.

c. **Indirect Fire:** CAS is deconflicted from indirect fire systems by use of informal ACA methods. Formal ACAs are not authorized in live fire. Aircraft will not underfly indirect fire gun-target lines, even if these systems are in checkfire. Rotational units must coordinate with DTAC (Zulu TOC) to receive approval for ACA's outside unit boundaries. Protect all CAS attacks by an informal ACA method. It is the responsibility of the artillery and mortars to ensure fires and the effects of fires do not enter active ACA's, (i.e., do not engage targets closer than 1,000 meters to the ACA boundary).

(1) **Lateral Separation:** Indirect fires and CAS may attack different targets simultaneously if the indirect fire GTL and CAS target are deconflicted by an ACA. CAS will engage targets within the ACA and indirect fires will not engage targets within 1,000 meters of the ACA.

(2) **Time Separation:** When deconflicting targets by time, there must be a minimum of 30 seconds separation between the last round of artillery/mortars on the ground and the first aircraft on target. In other words, an ACA is in effect 30 seconds prior to aircraft on target. Aircraft will not overfly (ingress/egress along) indirect GTLs.

(3) **Altitude Separation:** For SEAD purposes, it is sometimes desirable for the artillery to provide continuous suppression on the CAS target or an ADA system. Using altitude separation, artillery can fire a low-angle mission while aircraft attack the target. By establishing lateral separation and altitude restrictions, as described below, you can ensure safe fighter clearance from the artillery trajectory and fragmentation patterns.

(a) **General Restrictions:** Units will not establish a single Maximum Ordinate (Max Ord) over their sector for an entire battle. **Artillery high angle, RAP, and mortar fires will not be deconflicted by altitude separation.**

(b) **Minimum-Essential Requirements for Artillery:** The mission must be coordinated by a time hack or TOT. For safety purposes, the first "volley" of the artillery mission must impact NLT 30 seconds prior to first aircraft on target; this ensures all guns (units) are engaging the correct target area. (**Note:** The artillery can continue to engage per fire order i.e., continuous suppression, one round per minute, battery 6, etc.) There can be no change to artillery trajectories during the mission. Once the fighters depart the IP, no additional guns or firing units may "join in" the mission late. The FSO responsible for the attack must determine "ORD 1" and pass this to the ALO. (ORD 1 is described below in subparagraph f).

(c) **Minimum-Essential Requirements for Fighters:** The 9-line will specify a magnetic attack heading which is perpendicular to the active GTLs. (See Figure B). Aircraft can maneuver 65 degrees left or right of this attack heading (i.e., ensure there is a minimum of 25 degrees lateral separation from the GTLs until the fighters reach the target. The minimum altitude is 3,000 feet AGL when attacking the same target as artillery, unless ORD 1 is higher. The ALO must pass the higher of the two altitudes as the Stay-Above Altitude (SA) to the fighters. Using ORD 1 or 3,000 feet AGL, whichever is higher, restricts aircraft from crossing the GTL short of one kilometer of the artillery target.

(d) **Same Target or Target Area Definition:** For clarity, the artillery target includes the target grid with



a 1-kilometer radius around it.

(e) **Low-Angle Mission Definition:** Any artillery mission requiring a quadrant of 800 mils and lower. An artillery "mission" can mean a single target or a group (see paragraph 4).

(f) **Determining ORD 1:** Using the method described below, determine the appropriate SA altitude by calculating "ORD 1" based on the trajectory of the artillery fire mission. If more than one firing unit is engaging the target, then this procedure is used to check each GTL; use the highest value as the SA altitude. Use the following steps/criteria to calculate ORD 1, also reference the enclosed slide, ORD 1, example).

**STEP 1** - Draw a line from the firing unit location to the suppression target location and determine the Gun -Target Range. Also determine the vertical interval between the firing unit and the target.

**STEP 2** - Ask the firing unit(s) what charge they will use on the suppression target. Reference the appropriate Firing Tables Trajectory Chart for the specified charge. Determine the trajectory arc that will achieve the suppression target range with the vertical interval applied. (If the target range falls between two trajectory arcs then select the higher arc, always interpolate up).

**STEP 3** - Determine the altitude of the projectile (trajectory) by tracing the arc to a point one kilometer (1 km) short of the target. The referenced altitude is in meters; convert this to feet by multiplying the trajectory altitude by 3.3. Add 1,000 feet to the converted trajectory altitude to compensate for atmospheric and "non-standard" conditions. This converted altitude is "ORD 1" and is used as the SA altitude if it is higher than 3,000 feet.

**STEP 4** - All altitude references are AGL. Fighters must receive the SA altitude as MSL, just like the target altitude is expressed as feet MSL in the CAS Brief (9-Line). SA MSL is the sum of the target altitude plus ORD 1.

(4) **Deconfliction of multiple indirect fire targets:** It is possible to deconflict artillery groups. One method of deconfliction is to use the restrictions outlined in paragraph c(3) above for each target/firing unit in the group. The easiest method is to have all of the fire direction centers (FDCs) report their Max Ord for the target they will fire in the group and use the highest one as the minimum bombing altitude. All other artillery and mortar fires must be time or laterally separated from the CAS target (i.e., not violate the ACA). If fighters must cross a GTL, within the group, to get to their target, then the FSO/ALO will restrict the CAS above the Max Ord. Fighters should avoid crossing GTLs whenever possible.

d. **CAS bombing and strafing:** Must be conducted IAW applicable minimum safe distances for the ordnance being employed. (See FAC PAC).

(1) **Minimum safe distances are as follows:** 2,000 meters for 500-lb and 1000-lb bombs; 2,500 meters for 2,000-lb and larger bombs. No AGMs, PGMs and cluster munitions are allowed in live fire. Final attack heading (FAH) for strafing must be oriented away from friendlies and specified in the "9-line." Minimum safe distance for strafing is 1,000 meters from friendlies to a target with a final attacking heading away from friendlies.

(2) **Aircraft minimum bombing altitude,** outside the RDZs, is determined by the appropriate fragmentation standoff for the ordnance being employed.

e. **Overflight constraints:** CAS will not "hold" over friendly troops.

f. **Weather minimums:** VFR weather criteria is 2500/5 with TACP and flier final responsibility to make weather determinations.

g. **USAF FAC responsibilities:** All ordnance deliveries will be under the direct control and with clearance from a qualified terminal air controller (ETAC/FAC-A/ALO). Each aircraft (on each pass/attack) will receive specific clearance from the final control authority prior to releasing ordnance. All ABORT calls are given in the clear (no authentication) by anyone observing an unsafe act. Ravens will be informed of the CAS plan, frequencies,



and must be able to observe the CAS target area (it is the rotational unit responsibility to ensure the Ravens have the plan). The only frequencies permitted for use in the NTC complex are those on the TAD listing or in the NTC approved unit SOI.

h. **Final control responsibilities:** No player GFAC (ETAC / ALO) "eyes-on" requirement (other than Raven personnel) is required for targets 7.5 km beyond friendly elements. An FAC-A can assume responsibility for a CAS target beyond 3 km of the FLOT. **Note:** Player units will not build CAS target plans expecting the Ravens to fulfill the FAC requirement. The Ravens have no responsibility to observe CAS targets that the player GFACs or FAC-A cannot observe.

i. **CAS target marking:** CAS targets must be marked (i.e., WP, artillery/mortar fires, ground burst illumination, FAC-A WP rockets etc.) if the CAS target is within 7.5 km (7,500 meters) of the FLOT. The most forward line of friendly vehicles must be marked; not every vehicle need be marked, but marking must allow for quick aerial identification of the front line trace (flank vehicles or personnel positions, for example). Individual positions forward of the FLOT (i.e., OPs, COLTs, GFACs, etc.) must be marked. FAC-As and attack aircraft must confirm location of friendly forces. Laser designators do not eliminate the need for a visual mark. Examples of marking methods for friendly positions include: VS-17 panels, colored smoke (not white or red), reflective surfaces, infrared lights and tape, strobe lights, etc. "Notional" fires will not substitute for a mark within 7.5 km of the FLOT.

j. **Airspace management:** Airspace for TACP, FAC-A and fighter use is the space defined in the tactical orders from the rotational unit employing CAS. The rotational unit must coordinate use of airspace outside of its sector/zone with the DTAC (ZULU TOC). Raven personnel are the only ones allowed to clear aircraft into live-fire airspace.

k. **Weapon control status:** Ground units do not have to be in a restricted weapon control status (i.e., GREEN and CLEAR) during CAS operations; they are free to remain RED DIRECT, etc.

i. **Ordnance dumping:** Aircraft which are unable to expend all ordnance in live fire will be directed to an alternative target in Leach Lake Tactics Range by Raven/Rustic.

m. **CAS target grid clearance:** Raven personnel will monitor the grid specified in the 9-line and coordinate clearance through Zulu TOC. Aircraft must engage targets within 1 km of a cleared grid. Aircraft must also adhere to ordnance minimum safe distances and strafing restrictions, as applicable. (See paragraph d.(1)).

### 3. REFERENCES.

- a. **AR 385-63, Policies and Procedures for Firing Ammunition for Training, Target Practice, and Combat.**
- b. NTC Live Fire Safety Waivers to AR 385-63.
- c. NTC ROE (26 FEB 96): Section III (Live-Fire Operations).
- d. Air Warrior Operations Order (Special Instructions, "SPINS").
- e. FT 120-D-1, Cannon, 120-mm Gun, M256, M1A1 and FT 25-A-1, Cannon, 25-mm Gun, M242, M2/M3 BFVs.
- f. **Joint Pub 3-09.3, Joint Tactics, Techniques, and Procedures for Close Air Support (CAS)**, 1 December 1995.

4. POC is Zulu Team, Phone: DSN 470-4369 or (Raven Team), Phone: 470-4068. ☎

(Original Signed)